

MACWORLD

June 1992 \$3.95 Canada \$4.95

How It Works

THE MICROPROCESSOR

First in a Three-Part Series:
All about Your Personal Computer



MW LAB

Slide Scanners

13 PRODUCTS TESTED AND COMPARED

All about Scanners

A PRACTICAL BUYER'S GUIDE

Data Representation

TIPS FOR ACCURATE PRESENTATIONS

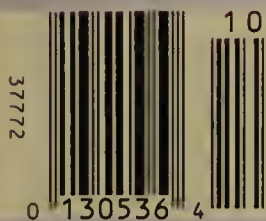
MW LAB

CD ROM Drives

16 PRODUCTS TESTED AND COMPARED

QuickTime—Your First Time

HOW TO MAKE MOVIES



lci

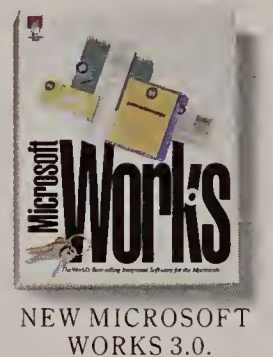


FRANK SERAFINE, A MICROSOFT WORKS
USER SINCE 1986, ALSO DESIGNED SOUND EFFECTS
FOR *POLTERGEIST II: THE OTHER SIDE*.

Frank has been under the sea, into the afterlife, and to the end of the universe. With new Works 3.0, there's no telling where he'll go next.

In the last few years, Frank's business has come a long way. So has Microsoft® Works. Coincidence? You won't think so when you see how far new Works 3.0 can take your business. This holds true whether you're working on *Star Trek: The Motion Picture* (like Frank) or something more down-to-earth.

That's because in addition to its enhanced word processor, database, spreadsheet with charting, drawing and communications tools, Works is loaded with lots of other new features.



Take for example its built-in business templates. You just put in the information, and Works does the rest: income statements, payroll, and more. After all, it's this attention to detail that has made Microsoft Works the industry's leading integrated product.

You'll even have a handy set of Avery® label forms online. They make printing mailing labels as easy as licking the stamps. And with its online Help, tutorial and the *Getting Started* booklet, everything about Works is easy.

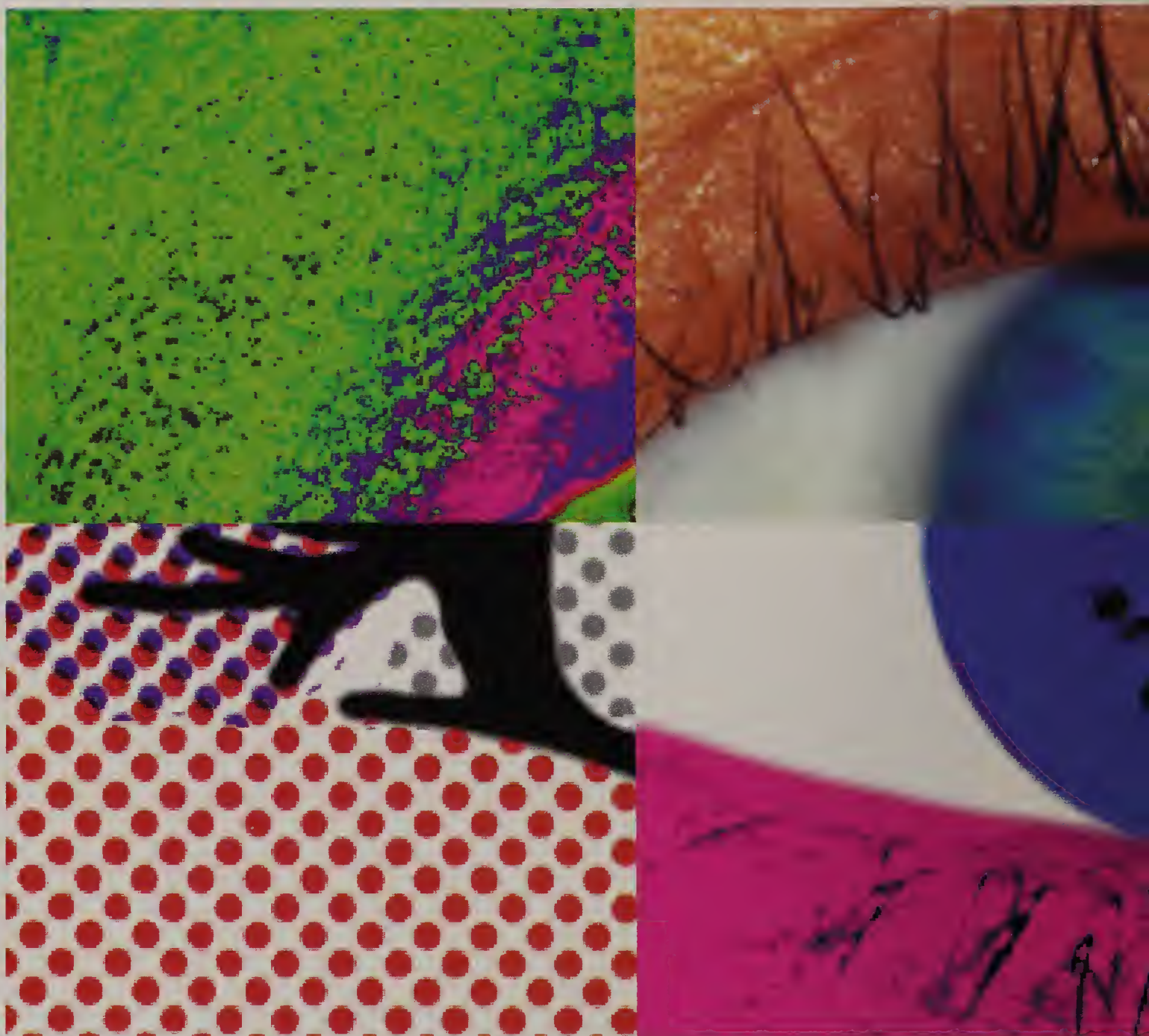
But don't let that fool you.

Works is powerful enough to grow with your business. To see how far, call (800) 541-1261, Department X42, for the closest Macintosh® reseller.

Microsoft
MAKING IT EASIER



Made for Macs.
Not only are the new
FG series of monitors
made specifically
for Apple Computers,
we also make
many other Apple
compatible peripherals,
from CD-ROM
devices to a
full line of
printers.



NEC and Radius have designed a display

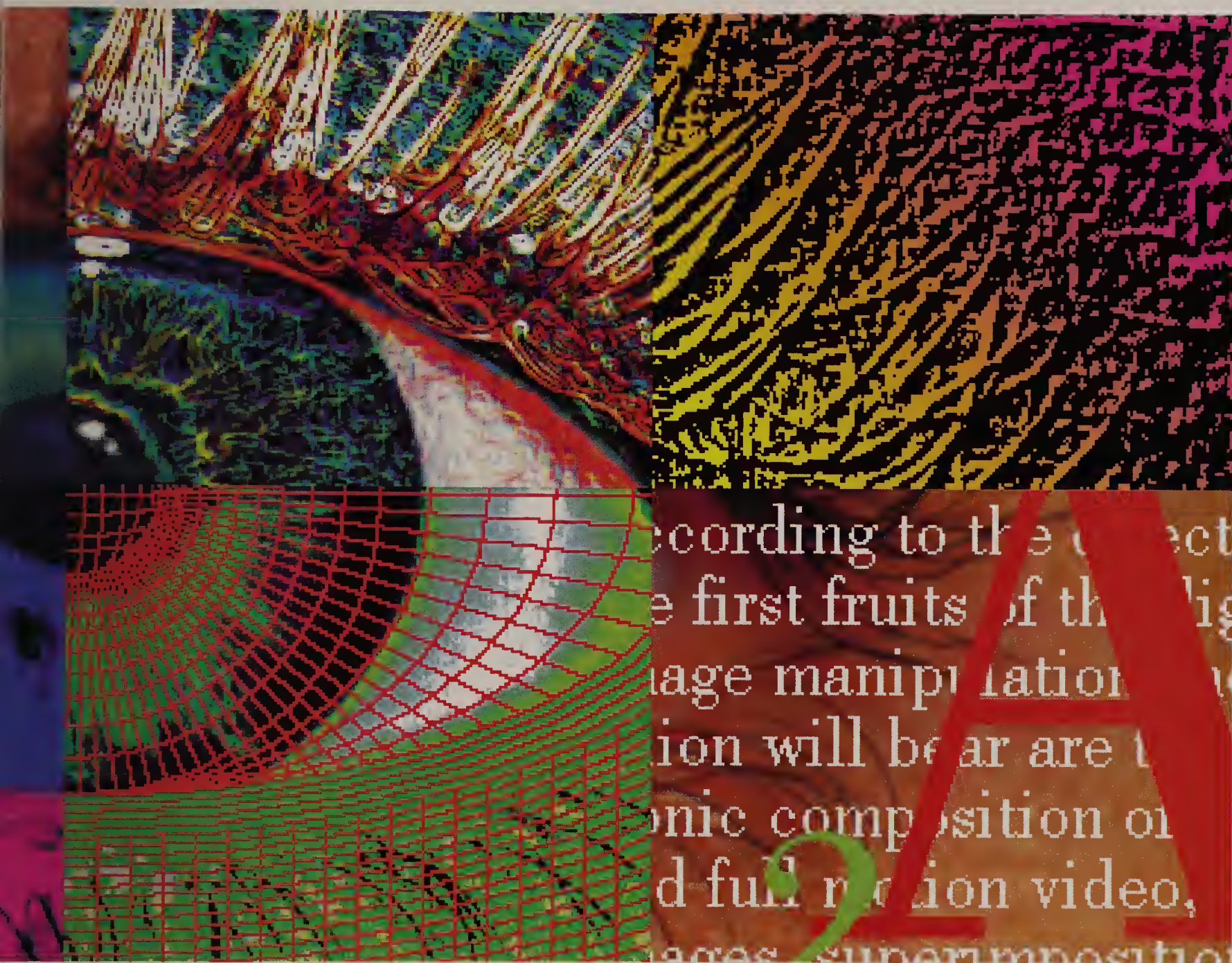
Presenting NEC's 15", 17" and 21" MultiSync® FG™ display systems*—a colorful combination of our award-winning monitor technology and a display interface card designed specially for NEC FG monitors by Radius™.



Multiple viewing modes give you more flexibility than you've ever had before and allow you to use all your applications more effectively.

For instance, condensed modes let you increase resolution and desktop size. So you can display more on-screen information and do everything from putting two documents side by side, for easy cutting and pasting, to displaying more cells in your spread sheets. There's also a 72 DPI mode which gives you a WYSIWYG view of your final output. While expanded modes let you enlarge images and get a closer look at your work.



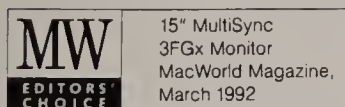


According to the experts,
the first fruits of the digital
image manipulation revolution
will bear are the
electronic composition of
and full motion video,
images superimposed

system that will make you open wide and say ahhh.

But the best part is, as you change applications, you can switch to any of these modes on the fly. Right from the control panel. You don't even have to restart the computer.

Our MultiSync FG monitors also feature FullScan™ capability, for edge-to-edge images.




And our exclusive AccuColor™ Control System lets you adjust your on-screen color to match

your printed output. The MacFG™ Board is NuBus™ compatible and includes QuickDraw™ acceleration. And it's available in two versions.

The MacFG 8X supports 8-bit color and the MacFG 24X supports 24-bit color. So take a look at these display systems. We're sure

you'll see things our way. For more information, call 1-800-NEC-INFO. (In Canada, 1-800-343-4418.) Or for information via fax, call 1-800-366-0476, request # 62234.

Free CD-ROM reader
when you buy a
MultiSync FG Display
Solution between 6/1/92
and 9/15/92.
Call 1-800-366-0476,
request #2222 for
promotion details
via fax.

Because  is the way you want to go.

NEC

Contents

MACWORLD THE MACINTOSH® MAGAZINE OCTOBER 1992

FEATURES



On the Cover
THE FIRST OF A THREE-
PART SERIES
DEMYSTIFYING THE
MAC'S INNER WORKINGS,
OUR FEATURE
BEGINNING ON PAGE 136
EXPLAINS HOW THE
MAC'S POWERFUL
PROCESSOR PERFORMS
ELABORATE DATA
COMPUTATIONS. (PHOTO
BY ALEX VIARNES.)



Page 113

Your Computer Revealed: Inside the Processor 136

BY LON POOLE In this three-part series, *Macworld* takes you on a visual tour of how your computer works. First stop: the processor, the Mac's tiny "brain," which handles its complex tasks with incredible speed and power.



CD ROM Drives: Into the Mainstream 144

BY LIZA WEIMAN From QuickTime movies to multimedia encyclopedias to animated children's stories—CD ROM discs are turning up everywhere. For those ready to join the action, Macworld Lab tests 16 drives to point you toward the best bargain.

All about Scanners 150

BY JAMES A. MARTIN Should you get a flatbed or a hand-held scanner? Or should you opt for a higher-end model, like a sheet-fed or a slide scanner? What about color versus gray scale? This practical buyer's guide weighs the pros and cons to help you decide.



Seeing Through Slide Scanners 156

BY JOE MATAZZONI Macworld Lab tests 13 transparency scanners—from dedicated slide scanners to flatbeds with attachments—to find out which give you the highest-quality images at the best price.

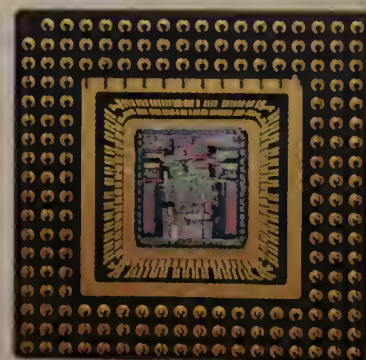
What's Wrong with This Picture? 164

BY CHARLES SEITER Pretty charts can do more harm than good, obscuring or misrepresenting data. Try our tips for making accurate presentations that still look sharp.

QuickTime—Your First Time 170

BY DAVID POGUE Start with a fast Mac, find a video source, get a digitizing board, stir in some digital sound, and add a video editor. Now you're ready to follow our recipe for making your own digital movies.

Page 136



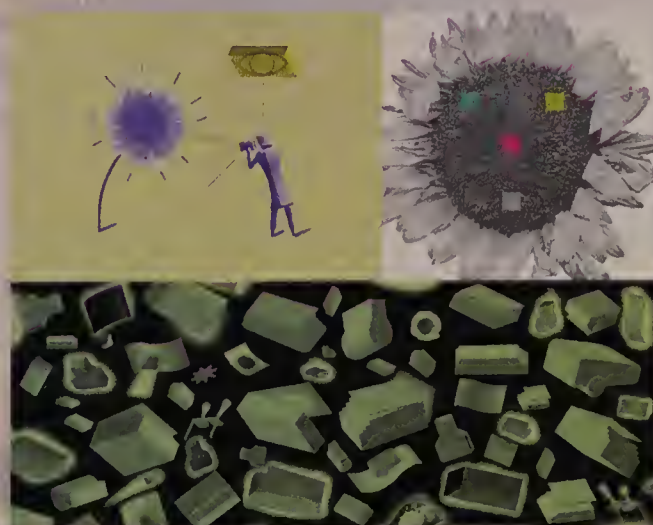
REVIEWS

- 178 Microsoft Excel 4.0
Spreadsheet
- 179 MacTools 2.0;
Norton Utilities for
Macintosh 2.0
Disk utility packages
- 181 Performance/040
(33MHz); Radius Rocket
33; TokaMac II FX 33
33MHz accelerator boards
- 184 HP PaintJet XL300
Color ink-jet printer
- 188 AccessPC 2.0; DOS
Mouter 3.0; Macintosh
PC Exchange 1.01
File-transfer utilities
- 190 LetraStudio 2.0
Type-manipulation program
- 198 Fair Witness 1.1
Integrated project-planning
software
- 198 The Bat
Ergonomic keyboard
- 199 RasterOps
CorrectPrint 300
Dye-sublimation printer
- 199 The Miracle Piano
Teaching System
Piano-instruction keyboard
and software
- 200 Super Tetris 1.0
Tile game
- 200 Where in the World Is
Carmen Sandiego?
Education game
- 202 easyPrint 1.0
Printer chooser
- 202 HiQ 1.0
Numerical mathematics
software
- 206 ConstructionMac 1.2
Construction and remodeling
software
- 206 Ultima Home Office
Fax modem with voice mail

- 208 Kid Pix Companion 1.0
Paint program
- 208 Quantum Passport XL 240
Removable hard drive
- 209 DateBook 1.0
Personal time manager
- 209 Nok Nok 1.0
File-share monitoring utility
- 210 NueX 1.1
Expert systems software
- 210 Now Up-to-Date 1.0.1
Network calendar program
- 212 RouterCheck 2.0
Network-administration utility
- 212 Transparent
Language 1.04M
Foreign-language reader



Page 170



Page 150

- 18 How to Contact
Macworld
- 21 MacBulletin
- 25 Commentary/
Jerry Borrell
- 37 Letters
- 51 Art Beat
BY CATHY ABES
- 67 The Iconoclast
BY STEVEN LEVY
Reviewing QuickTime clips
- 75 Conspicuous
Consumer
BY DEBORAH BRANSCUM
How Ehman Inc. unraveled
- 93 Updates
- 101 Lab Notes
BY MARK HURLOW
- 113 News
BY DAN LITTMAN AND
TOM MORAN
- 215 The Desktop Critic
BY DAVID POGUE
The Department of Music
Education
- 219 New Products
- 225 How To/Quick Tips
BY LON POOLE
- 233 How To/Getting
Started
BY JIM HEID
Font-customizing techniques
- 237 How To/Insights
BY LON POOLE
Persuasion 2.1
- 243 Where to Buy
- 304 Best-Sellers

Don't be fooled by more expensive slide scanners.



Separation quality images delivered to your Macintosh® for less than a dollar per dpi. Quick one-pass, 30 bit scanning at 2,700 dpi resolution. Automatic white and dark color calibration for increased shadow and highlight detail without over-saturation. Plus bundled image editing and separation software for professional results.

Introducing the mira•35 slide scanner: the affordable alternative.

Call us for more information and the name of your nearest authorized dealer.

See why you should be paying less for more.



SANTOS TECHNOLOGY INC.

800-966-9960

voice 310-320-8888

fax 310-212-6688

See us at Seybold, San Francisco, September 23-25, Booth #429

Macintosh® is a registered trademark of Apple Computer, Inc.
mira•35 is a trademark of Santos Technology Inc., 383 Van Ness Ave., Suite 1604, Torrance, CA 90501

Circle 124 on reader service card

MACWORLD

PRESIDENT AND CHIEF EXECUTIVE OFFICER/
MACWORLD COMMUNICATIONS, INC.

James E. Martin

EXECUTIVE VICE-PRESIDENT

Jerry Borrell

PRESIDENT/CEO

A+ PUBLISHING DIVISION

Paul Boulé

PRESIDENT/COO

MACWORLD CD ROM PUBLISHING VENTURES

Dan Orum

VICE PRESIDENT/BUSINESS DEVELOPMENT

Lindsay Davidson

MACWORLD is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 181 computer publications in 58 countries. Thirty million people read one or more International Data Group publications each month. International Data Group's publications include: **ARGENTINA'S** Computerworld Argentina, Infoworld Argentina; **ASIA'S** Computerworld Hong Kong, PC World Hong Kong, Computerworld Southeast Asia, PC World Singapore, Computerworld Malaysia, PC World Malaysia; **AUSTRALIA'S** Computerworld Australia, Australian PC World, Australian Macworld, Profit, Information Decisions, Reseller; **AUSTRIA'S** Computerwelt Oesterreich; **BRAZIL'S** DataNews, Mundo IBM, Mundo Unix, PC Mundo, Publish; **BULGARIA'S** Computerworld Bulgaria, Ediworld, PC World Express; **CANADA'S** Direct Access, Graduate Computerworld, InfoCanada, Network World Canada; **CHILE'S** Computerworld, Informatica; **COLOMBIA'S** Computerworld Colombia; **CZECHOSLOVAKIA'S** Computerworld Czechoslovakia, PCWorld Czechoslovakia; **DENMARK'S** CAD/CAM WORLD, Communications World, Computerworld Danmark, Computerworld Focus, Computerworld Uddannelse, LAN World, LOTUS World, Macintosh Produktkatalog, Macworld Danmark, PCWorld Danmark, PCWorld Produktguide, Windows World; **ECUADOR'S** PC World; **EGYPT'S** PC World Middle East; **FINLAND'S** Mikro PC, Tietoviikko, Tietoverkko; **FRANCE'S** Computer Direct, Distributique, Golden, InfoPC, Languages & Systems, Le Guide du Monde Informatique, Le Monde Informatique, Telecoms & Reseaux International; **GERMANY'S** Computerwoche, Computerwoche Focus, Computerwoche Extra, Computerwoche Karriere, edv aspekte, Information Management, Lotus Welt, Macwelt, Netzwerk, PC Welt, PC Woche, Publish, Unit, Unix Welt; **GREECE'S** Infoworld, PC Games, PC World Greece; **HUNGARY'S** Computerworld SZT, Mikrovilag Magazin, PC World; **INDIA'S** Computers & Communications; **ISRAEL'S** Computerworld Israel, PC World Israel; **ITALY'S** Computerworld Italia, Macworld Italia, Networking Italia, PC World Italia; **JAPAN'S** Computerworld Japan, Macworld Japan, SunWorld Japan; **KENYA'S** East African Computer News; **KOREA'S** Computerworld Korea, Macworld Korea, PC World Korea; **MEXICO'S** Compu Edicion, Compu Manufactura, Computacion/Punto de Venta, Computerworld Mexico, MacWorld, Mundo Unix, PC World, Windows; **THE NETHERLANDS'** Computer! Totaal, Computerworld Netherlands, LAN Magazine, MacWorld Magazine; **NEW ZEALAND'S** Computer Listings, Computerworld New Zealand, New Zealand PC World; **NIGERIA'S** PC World Africa; **NORWAY'S** Computerworld Norge, C/world, Lotusworld Norge, Macworld Norge, Network, PC World Ekspress, PCWorld Norge, PC World's Product Guide, Publish World, Student Guiden, Unix World, Windowsworld, IDG Direct Response; **PERU'S** PC World; **PEOPLE'S REPUBLIC OF CHINA'S** China Computerworld, PC World China, Electronics International, IDG HIGH TECH New Product World, Consumer Electronics New Product World; **PHILIPPINES'** Computerworld, PC World; **POLAND'S** Computerworld Poland; **ROMANIA'S** Infoclub Magazine; **RUSSIA'S** Computerworld-Moscow, PC World, Networks; **SPAIN'S** Amiga World, Autoedicion, CIMWorld, Computerworld Espana, Comunicaciones World, Macworld Espana, PC World Espana, Publish; **SWEDEN'S** Affarsekonomi Management, Attack, CAD/CAM World, ComputerSweden, Corporate Computing, Digital Varlden, Lokala Natverk/LAN, Lotus World, MAC&PC, Macworld, Mikrodatorn, PC World, Publishing & Design (CAP), Unix/Opna system, DataIngenjoren, Maxi Data, Windows; **SWITZERLAND'S** Computerworld Schweiz, Macworld Schweiz, PC & Workstation; **TAIWAN'S** Computerworld Taiwan, PCWorld Taiwan; **THAILAND'S** Thai Computerworld; **TURKEY'S** Computerworld Monitor, Macworld Turkiye, PC World Turkiye; **UNITED KINGDOM'S** Lotus Magazine, Macworld; **UNITED STATES'** AmigaWorld, Cable in the Classroom, CIO, Computer Buying World, Computerworld, Digital News, DOS Resource Guide, Electronic News, Federal Computer Week, GamePro, inCider/A+, IDG Books, InfoWorld, LOTUS, Macworld, MPC World, Network World, NeXTWORLD, PC Games, PC Letter, PC World, Publish, RUN, SunWorld, SWATPro; **VENEZUELA'S** Computerworld Venezuela, MicroComputerworld Venezuela; **YUGOSLAVIA'S** Moj Mikro.

Multimedia Performer.



Chinon's New CD-ROM Drive.

Multimedia is hot—and here's a CD-ROM drive that can take the heat. Chinon drives have a reputation for rugged construction and rock-solid reliability. Plus the 435 series drives are fully MPC and QuickTime compatible, with a 64KB data buffer and a sustained data transfer rate of 150KB per second. This means you can run all your multimedia applications without missing a beat.

These drives have a small footprint for easy portability, direct RCA audio outputs, and a headphone jack with full-range volume control. And our standard SCSI interface makes connection to your computer a snap.

Chinon's external drives are available for both IBM-compatible and Macintosh computers, with a half-height internal version for IBM compatibles.

Best of all, Chinon quality in a CD-ROM drive costs less than many comparable drives, not more. So call today for the reseller nearest you—and put a multimedia performer in your corner.

CHINON

The Drive to Succeed

Chinon America, Inc., 615 Hawaii Avenue, Torrance, CA 90503 Toll-free (800) 441-0222 In California (310) 533-0274

IBM is a registered trademark of International Business Machines Corporation. Macintosh and QuickTime are trademarks of Apple Computer, Inc.

Circle 64 on reader service card



User Guide



Adobe Premiere™

Version 2 for Macintosh®

READ THE BOOK.

INTRODUCING ADOBE PREMIERE™ 2.0. The editing program that lets you create high-quality QuickTime™ digital movies and videotapes right on your Macintosh®, right from the start. In fact, making movies has never been easier, faster or more precise. It's like having a professional production studio on your desktop. Create dramatic transitions. Mix sound. Superimpose graphics and titles. Add animation. Generate special effects. Even fly a movie clip around the screen. Then, when you're finished,

Adobe, the Adobe logo, Adobe Premiere and the Adobe Premiere logo are trademarks of Adobe Systems Incorporated which may be registered in certain jurisdictions. Macintosh is a registered trademark and QuickTime is a trademark of Apple Computer, Inc.



SEE THE MOVIE.

output your blockbuster directly to videotape. Or, with support for time code and edit decision lists, you can export your work to professional production equipment for the highest-quality output. And because you own the studio, you have complete creative control and save money like crazy. To arrange an Adobe Premiere screening, see your Adobe™ Authorized Reseller or call Adobe at 1-800-833-6687, Dept. K 1246.



© 1992 Adobe Systems Incorporated. All rights reserved.

ADOBE

Circle 134 on reader service card

REDUCE

YOUR

POSTAGE

COSTS

BY 50%



Steve Belmonte, President & Developer

The **First & Only** State-of-the-Art, **Bulk Mailing Software** for the Macintosh!

Enter in All or the Beginning of
Any City and State in the U.S.,
and AccuZip6 will Add the Proper
Zip+4, Carrier Route & Postnet Bar Code

Enter in Any Address
in the U.S. and AccuZip6
will completely Parse, Correct,
and Standardize it immediately.

Groups allow
you to have
many Mailing
Lists within
One Database.
AccuZip6 can
Store up to
4GB of Data

Count: 0 of 5951

Save	Self/First/Last/Title	Mr	Steve	Belmonte	President
Cancel	Company Name	Software Publishers, Inc.			CR22
Delete	Building or Dept:				
New Letter	Mailing Address	16531 Bolsa Chica St STE 306			
Mail Merge	City/State/Zip Code	Huntington Beach	CA	92649-3595	
Quick Find	Bar Code/Country	[Barcode]			USA
Date Stamp	Telephone 1:	(800) 233-0555	Toll Free	<input type="radio"/>	
	Telephone 2:	(714) 846-1908	Business	<input type="radio"/>	
	GROUP CODE #1	Software Developer	GROUP CODE #3	Purchased	
	GROUP CODE #2	Advertising	GROUP CODE #4	Send Information	
	Notes				

This is the Postnet
Bar Code! It is added to
all Deliverable Addresses
in your database!

Enter 1-5 digits for the
Zip Code and AccuZip6 will
Match it to your Address and
Add the Proper Zip+4, Carrier Route
and Postnet Bar Code

CASS CERTIFIED BY THE USPS



ACCUZIP6

AccuZip6 is a Registered Trademark of Software Publishers, Inc.

- Integrated Mail Merging
- Avery® Labels
- 1st, 2nd & 3rd Class Presorts
- Prints All Postal Forms
- Prints Postal Reports
- Prints All Sack Tags
- Imports Any ASCII File
- Zip+4 Data on CD or Diskette
- System 7.0 Compatible
- Quadra Compatible
- Very, Very Simple to Use
- Money Back Guarantee

(800) 233-0555

SOFTWARE PUBLISHERS Inc.

16531 Bolsa Chica St STE 306 • Huntington Beach, Ca 92649-3595
Bus (714) 846-1908 • Fax (714) 840-0464

Circle 154 on reader service card

MACWORLD

EDITOR-IN-CHIEF

Jerry Borrell

EDITORIAL

EDITOR	Adrian Mello
SENIOR EDITOR/DEPARTMENTS	Deborah Branscum
SENIOR EDITOR/FEATURES	Cheryl England
SENIOR EDITOR/REVIEWS	Carol Person
SENIOR ASSOCIATE EDITOR/LAB MANAGER	Chip Carman
SENIOR ASSOCIATE EDITOR/FEATURES	James A. Martin
SENIOR ASSOCIATE EDITOR/FEATURES	Liza Weiman
ASSOCIATE EDITOR/DEPARTMENTS	Cathy E. Abes
ASSOCIATE EDITOR/FEATURES	Galen Gruman
ASSOCIATE EDITOR/LAB	Mark Hurlow
ASSOCIATE EDITORS/NEWS	Dan Littman, Tom Moran
ASSOCIATE EDITOR/FEATURES	Charles Piller
ASSISTANT EDITOR/REVIEWS	Marjorie Baer
ASSISTANT EDITOR/NEW PRODUCTS	Evan Cooper
ASSISTANT EDITOR/FEATURES	Suzanne Courteau
ASSISTANT EDITOR/LAB	Tim Warner
EDITORIAL ASSISTANTS	Carolyn Bickford, Jim Feeley, Danny Lee
ASSISTANT TO THE EDITOR-IN-CHIEF	Susan P. Grant-Marsh
CONTRIBUTING EDITORS	Robert C. Eckhardt, Erfert Fenton, Jim Heid, Steven Levy, Joe Matazzoni, Deke McClelland, Tom Negrino, David Pogue, Lon Poole, Steve Roth, Charles Seiter, Franklin N. Tessler, Bruce F. Webster
INTERNATIONAL EDITORS	Alan Jones, Australia, 011 61 2 439-5133; Marianne Fajstrup, Denmark, 011 45 36 44 28 00; Jean Cassagne, France, 011 33 1 49 04 79 00; Stefan Frevel, Germany, 011 49 89 3 60860; Giulio Ferrari, Italy, 011 39 2 58 011660; Osamu Honma, Japan, 011 81 03 5276-0541; Shin Cho, Korea, 011 82 2 579-8031; Paul Molenaar, Netherlands, 011 31 23 354554; Bernhard Steen, Norway, 011 47 2 647 725; Alvaro Ibariez, Spain, 011 34 1 319 4014; Fredrick Landergren, Sweden, 011 46 8667-9180; Roger Bataillard, Switzerland, 011 41 1 55 1077; Cemal Balci, Turkey; Peter Worlock, United Kingdom, 011 4471 831-9252

COPY EDIT AND EDITORIAL PRODUCTION

MANAGING EDITOR	Charles Barrett
ASSISTANT MANAGING EDITORS	Luis A. Camus, Ruth Henrich
SENIOR COPY EDITOR	Katherine L. Ulrich
SENIOR PRODUCTION EDITOR	Jo Ann Villalobos
COPY EDITORS	Doreen J. Kan, Paul King, Felicity O'Meara
ASSISTANT PRODUCTION EDITOR	Lisa Brazieal

ART AND DESIGN

DESIGN DIRECTOR	Dennis McLeod
ART DIRECTOR	Joanne Hoffman
SENIOR DESIGNER	Leslie Barton
SENIOR DESIGNER/INFORMATIONAL GRAPHICS	Arne Hurty
ASSOCIATE ART DIRECTOR	Kent Tayenaka
ASSISTANT ART DIRECTOR	Sylvia Benvenuti
DESIGNER	Hae Yuon Kim
ASSOCIATE DESIGNERS	Tim Johnson, Matthew C. Nielsen
DESIGN ASSOCIATE	Martha Katt

EVENTS AND CONFERENCES

EVENTS MANAGER	Sandy Butler
EVENTS ADMINISTRATIVE ASSISTANT	Donna Deuell

EDITORIAL ADMINISTRATION

EDITORIAL MANAGER	Jane Lagas
EDITORIAL ADMINISTRATIVE ASSISTANTS	Wendy Sharp, Lyn Taylor

PRESIDENT/CEO AND PUBLISHER,
MACWORLD COMMUNICATIONS, INC.
ASSISTANT TO THE PRESIDENT

James E. Martin
Terri Edelman

THE LEADER IN LCD TECHNOLOGY PUTS IMAGE QUALITY IN A WHOLE NEW LIGHT.



INTRODUCING THE SHARP QA-1150 HIGH COLOR TFT LCD PROJECTION PANEL

Incredible brightness. Remarkable performance. It represents a whole new generation of TFT Active Matrix LCD. For computer and video images, for full-motion graphics, the full-featured Sharp QA-1150 makes multi-media presentations more brilliant than ever before.

There's a Direct Video Input so you can easily select between your PC* and a separate

video source. And a built-in Loop Through that lets you connect a local monitor to the panel for simultaneous viewing.

What's more, you can enlarge images, clear the screen temporarily, and have

the option of wireless PC control — all with the convenient remote.



You even have the flexibility of rear projection. At the simple flip of a switch. Easy to handle. Thrilling to watch. It's what makes the Sharp QA-1150 the brightest idea in LCD Computer/Video Projection.

So contact your local authorized Sharp Industrial LCD Products Dealer for a demonstration. Or call 1 (201) 529-8731. Fax (201) 529-9636.

SHARP
FROM SHARP MINDS
COME SHARP PRODUCTS™

LCD PROJECTION SYSTEMS • LCD COMPUTER/VIDEO PROJECTION PANELS • LCD DIRECT VIEW MONITORS

© 1994 Sharp Industrial Electronics Corporation, LCD Products Group, Sharp Plaza, Mahwah, NJ 07430-2135 *VGA and MAC II compatible. Simulated Screen Image.

Circle 109 on reader service card

Introducing Microsoft Excel spreadsheet today, because

We've been making Microsoft® Excel for the Mac® since 1985. Which is probably why we've gotten pretty good at making both routine and complex spreadsheet tasks easy to do.

Take our new Microsoft Excel 4.0. We've added floating Toolbars. Including six new ones which sensibly relate to a set of tasks, such as charting. You can move them around, resize them, and customize them easily.

With Drag and Drop, you can "grab" a piece of information with your mouse and drop it wherever you'd like to see it



on-screen. No need to cut-and-paste.

Autofill intelligently helps you build a worksheet.

Type JAN in a cell, for instance, and Autofill enters FEB, MAR—as many months as you need.

The new Autoformat button formats an entire worksheet in one step. The Chart-Wizard buttons make charting a snap.

And meet Wizards, step-by-step guides that walk you through complex tasks. The CrosstabWizard, for example, creates summary tables from a database for you: it prompts you, takes the information you give it, and creates a crosstab. It's that easy.

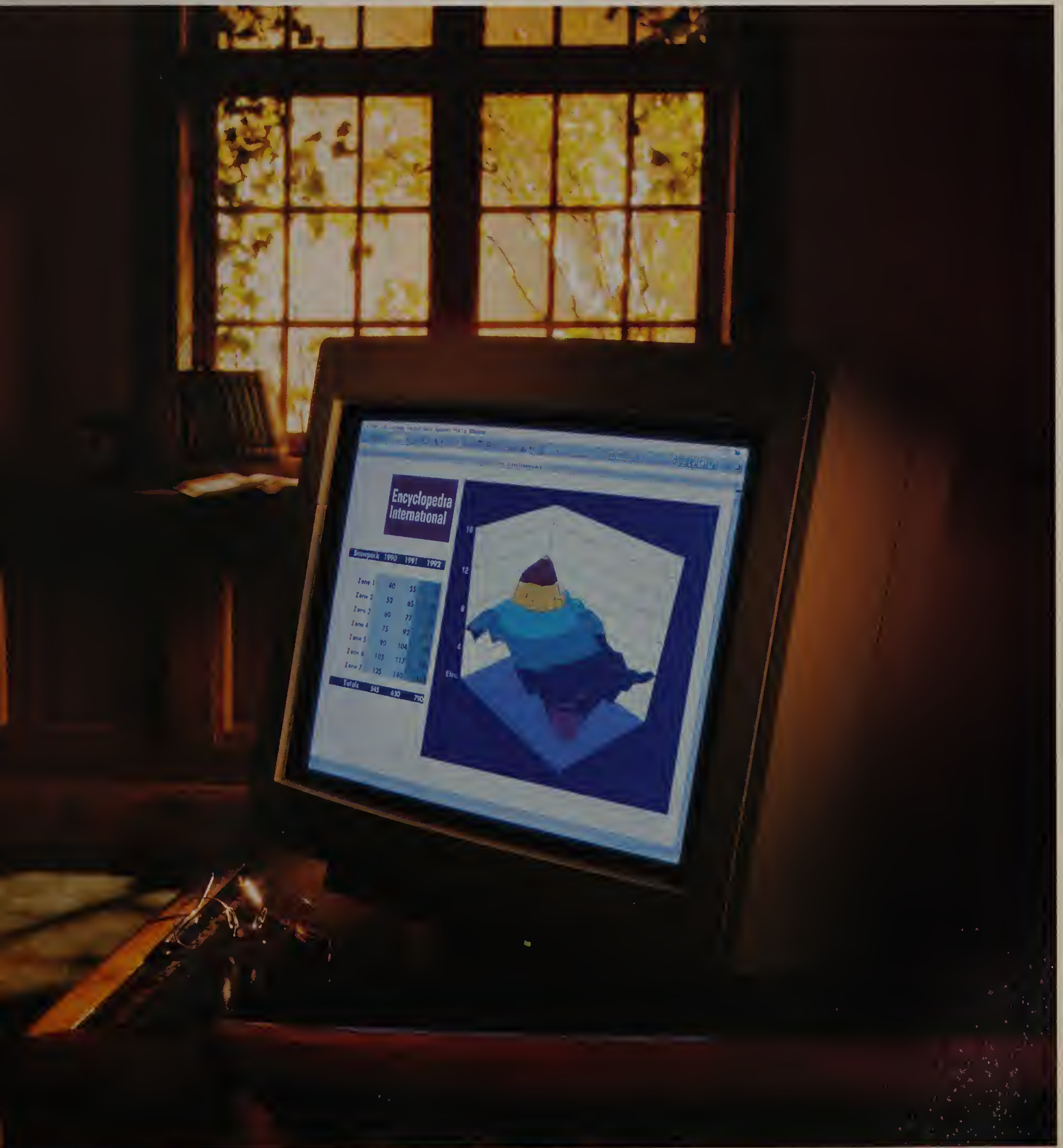
To sum up, if you want the most significant Microsoft Excel upgrade ever, call (800) 992-3675, Dept. B36. And see why the older you get, the smarter you get.

Microsoft
Making it easier



The gallery of 90 chart types includes new rotating

Excel 4.0. It's the smartest because it wasn't born yesterday.



3-D charts, along with surface, radar and picture charts. With the help of the ChartWizard, you can look like you were born making charts.

00) 992-3675, Dept. B36. For information only: In Canada, call (800) 563-9048; outside the 50 United States and Canada, call (206) 936-8661. Microsoft is a registered trademark of Microsoft Corporation. Mac is registered trademark of Apple Computer Inc.

Join the New Imaging Revolution

**10:00
Shoot**



The new *Canon RC-570 Still Video Camera* records 25 electronic photos on a reusable 2-inch video floppy disk. No film or processing. No waiting. No waste. The 3X zoom lens and 450-line frame video resolution ensure superior image quality. Speed, portability, ease of use, and direct playback to a TV monitor make the RC-570 an ideal imaging tool.

**10:12
Process**

Canon digitizers allow still video images to be easily input to Macintosh®, PC, or NeXT™ computers. Integrate graphic files into applications like DTP, Databases, Multimedia and Presentations. You can even record from your computer back to video floppy with our *Electronic Still Presentation* systems.



**10:45
Present**



Use the RC-570 still video camera connected to a TV monitor to deliver impressive computer generated presentations directly from your video floppy disk. No computers. No slides. No projectors. No hassles. *That's Revolutionary!*

Learn more about this revolution, call 1-800-221-3333 ext. 313.



Canon

© 1992 Canon USA, Inc. Still Video System Division, One Canon Plaza, Lake Success, NY 11042
Brand and Product names are trademarks of their respective holders.

Circle 110 on reader service card

MACWORLD

ADVERTISING SALES

VICE PRESIDENT/DIRECTOR OF ADVERTISING SALES	Shannon Dolan (415/243-0505)
ASSOCIATE ADVERTISING DIRECTOR	William P. Peck (415/243-0505)
NO. CALIFORNIA (SAN JOSE, SOUTH)	Cherie La France (415/243-0505)
NO. CALIFORNIA (WEST BAY), WASHINGTON, WYOMING, WESTERN CANADA	Regina T. Salaices (415/978-3155)
SALES ASSOCIATE	Edward Ramirez
NO. CALIFORNIA (EAST BAY, MARIN), IDAHO, MONTANA, OREGON	Suzanne Young Saluti (415/978-3262)
SALES ASSOCIATE	Jill Nightingale
SO. CALIFORNIA	Cathi T. Bledsoe (714/250-1307) Nancy Coy (714/250-1307)
SALES ASSOCIATE	Rachel Gillis
EASTERN/MIDWEST	
ADVERTISING MANAGER	Bill Thompson (201/967-1350)
MIDWEST/TEXAS	Lisa Ladle (708/827-4477)
SALES ASSOCIATE	Stacey Holman
MID-ATLANTIC/SOUTHEAST	Annette Bremer (201/967-1350)
SALES ASSOCIATE	Cathy Langhaar
NEW ENGLAND/FLORIDA	Joan Flynn (508/879-0700)
SALES ASSOCIATE	Susan Cardoza
MANAGER OF DIRECT-RESPONSE SALES	Beverly Schneider (415/978-3138)
ACCOUNT MANAGERS OF DIRECT-RESPONSE SALES	Wendi A. Smith (415/978-3117), Marsha Bowers (415/974-7413)
MACWORLD SHOPPER	Niki Stranz (415/978-3105), Carol Johnstone (415/978-3152), Shannon Smith (415/978-3257)
ASSISTANT TO THE DIRECTOR OF ADVERTISING SALES	Yuen Yeh (415/978-3258)

INTERNATIONAL SALES

SALES ASSOCIATE	Christine Wong
-----------------	----------------

MARKET RESEARCH

VICE PRESIDENT/RESEARCH	Gary L. Rocchio
RESEARCH COORDINATOR	Peter Summersgill

VICE PRESIDENT/MARKETING AND CIRCULATION	Lindsay Davidson
--	------------------

MARKETING

MARKETING MANAGER	Kimberlee Luedee
MARKETING EVENTS/MERCHANDISING MANAGER	Lisa Espinoza
MARKETING COMMUNICATIONS ASSISTANT	Darien Werfhorst
MARKETING ASSOCIATE/EVENTS AND MERCHANDISING	Jayne Salinger

CIRCULATION

SINGLE-COPY SALES DIRECTOR	George Clark
SUBSCRIPTION MANAGER	Lori Hitchcock
NEWSSTAND SALES MANAGER	Martin Garchar
SUBSCRIPTION PLANNING MANAGER	Elizabeth Jensen
SUBSCRIPTION MARKETING MANAGER	Susanna Camp
SUBSCRIPTION ASSISTANT	Kelvin Gee

PRODUCTION

VICE PRESIDENT/DIRECTOR OF MANUFACTURING	Anne Foley
PRODUCTION MANAGER	Claudia Dawn Smukler
ADVERTISING BILLING COORDINATOR	So Fong Yip
ADVERTISING TRAFFIC COORDINATOR	Arlette Crosland
PRODUCTION ASSISTANT	Gary Silverstein

ADMINISTRATION

DIRECTOR OF FINANCE	Vicki Peilen
DIRECTOR OF HUMAN RESOURCES	Shelly Ginenthal
DIRECTOR OF INFORMATION SYSTEMS	Walter J. Clegg
CORPORATE BUSINESS MANAGER	Christina W. Spence
ACCOUNTING/OPERATIONS MANAGER	Pat Murphy
ACCOUNTING/FACILITIES MANAGER	Michelle Reyes
FINANCIAL ANALYST	Madeleine Buckingham

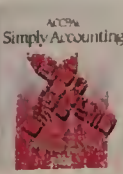
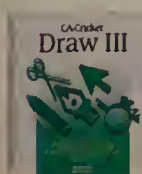


Gogh Crazy.

Presenting New CA-Cricket Draw III.

Friends, artists, Mac users...lend me your ears.

The world's hottest, most affordable drawing software has arrived: New CA-Cricket® Draw III.™



And we've packed it with today's most powerful features. Eleven Bezier-based, object-oriented drawing tools. Floating color windows

that allow you to select from RGB, HLS, CMYB & gray-scale color models. A dazzling new fountain fill tool. Masking and hole-cutting capabilities. A ruler-based text processor. Plus the ability to import PICT, EPSF, Scrapbook and MacPaint files.

And don't forget about our other powerful and easy-to-use Mac solutions: CA-Cricket® Presents,™ CA-Cricket® Graph,™ and ACCPAC® Simply Accounting.™

Dial 1-800 CALL CAI today for more product information or for the nearest dealer.

But you'd better hurry.

Because they're goghing like crazy.

© Computer Associates International, Inc., One Computer Associates Plaza, Islandia, NY 11788-7000.

COMPUTER ASSOCIATES
Software superior by design.

"Vincent Van Cricket." All artwork done in CA-Cricket Draw III by Jim Jackson, winner of the inaugural CA ImageNation Contest. Dial 1 800 CALL CAI for contest rules and more information.

Circle 10 on reader service card

The Colormate



*At NEC we make
a full line of
advanced monitors
ideally suited to the
Colormate family.
The MultiSync®
4FG™, 5FG™ and
6FG™ all deliver
exceptional clarity
and they all
feature our
amazing AccuColor™
Control System.*

The more presentations you have to make, the more you need the NEC Colormate™ PS printer. Because the Colormate pays for itself in no time. Legally. For as little as 49¢ a page.

Imagine color on paper or transparencies at only a tenth of the cost of sending work out. And what's more, at just \$4,799 (MSRP), it's the lowest priced PostScript™ language printer on the market.

The colors are as dazzling as the figures. Everything from soft pastels to brilliant primaries. And all Pantone® approved. 300 dpi graphics means sharp, clear output. The Colormate PS integrates readily with any network, PC or Mac®. Plus, it's compatible with all popular graphics software.


Imagine all the freedom and control creating presentations in house will give you. Last-minute changes can be made in minutes. Just think, for a few dollars you can have output that looks like a million bucks.



PS pays for itself.



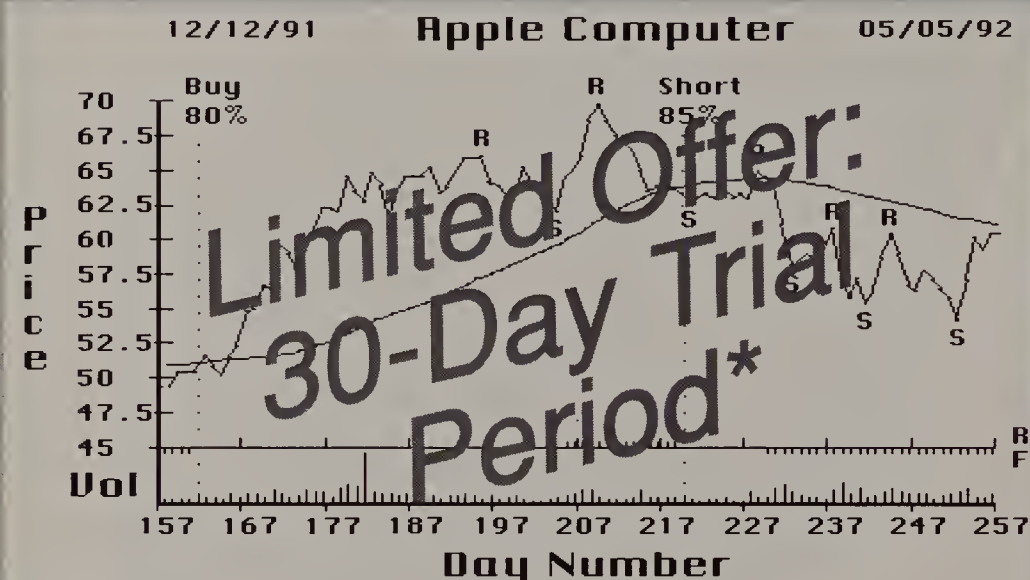
For information, dial 1-800-NEC-INFO (in Canada, 1-800-343-4418). Or via fax, call NEC FastFacts™ at 1-800-366-0476 and request # CMPS (2677). NEC GSA # GS00K91AGS5241.

Because  is the way you want to go.

NEC

Circle 16 on reader service card

\$11,750.00 PROFIT IN 5 MONTHS TRADING APPLE COMPUTER STOCK WITH OUR STOCK PROGRAM



COMPUTERIZED TRADING FOR THE REST OF US.

If you had purchased our **Right Time - Stock Program** in December, 1991, followed just the signals for Apple Computer, the rules in the manual and used a little common sense, your profits within the five month period shown above could have been \$11,750.00. Remember, this is a remarkable amount considering the fact that the software cost only \$599.00.

Our **Right Time** software is the best decision support system ever devised for traders. It's the only software that analyzes volume/price, support/demand, and global market trends all at the same time, and can give you profits like those shown here.

AMAZINGLY PRECISE.

The **Right Time™** programs run on IBM (and compatible), Apple II and Macintosh computers. The software is easy to use, amazingly precise, and very, clear in its signals.

You can retrieve and update signals for your stocks, commodities, indices or funds from Dow Jones, Warner, Signal, DBC, Bonneville or the Radio Exchange in less than 5 minutes per day. What's more, you can play "What If" games and have results in less than a second.

RESULTS: WINNING TRADES.

There are nine **Right Time™** programs available to help you make the right decisions at the right time.

- Stock Program or Stock Program/Long Term
- Index Program or Index Program/LT
- Futures Program
- Mutual Funds Program
- Day Trading Program/Index, Futures or Stock

FOR MORE INFORMATION OR TO PLACE AN ORDER.

Call (714) 721-8603 or write today for our free twenty-four page brochure or to place your order. Each of our end-of-day programs costs \$599 (combination prices are available) plus shipping and handling (S&H).

We also have demonstration programs for just \$59 (each) plus S&H. Each demo includes our complete manual.

Our **Right Time-Day Trading Programs** (Index, Futures or Stock) are priced at \$999 each.



T.B.S.P. INC.

The Better Software People
610 Newport Center Dr., Suite 1120
Newport Beach, CA 92660
(714) 721-8603 Fax: (714) 721-8635

© T.B.S.P. Inc. 1992

Future results may vary.

*Subject to restocking fee-See license for agreement

All programs not available on all computers.

Circle 25 on reader service card

MACWORLD

HOW TO CONTACT MACWORLD

SUBSCRIPTION SERVICES

For subscription service questions, call 800/234-1038, 800/288-6848, 303/447-9330, or 415/267-1743, or write Subscriber Services, P.O. Box 54529, Boulder, CO 80322-4529. For dealer inquiries, call 800/999-1170.

MACWORLD ON AMERICA ONLINE

Macworld subscribers can contact Macworld editors online via the Macworld area on America Online. The area features reviews, news, new-product announcements, version information, a database of products, and Macworld-sponsored message boards and conferences. Several of our editors log on regularly. To obtain a free America Online software kit, call 800/227-6364, extension 5254.

MACWORLD IN MICROFORM

Macworld is available on microfilm and microfiche from UMI, 300 N. Zeeb Rd., Ann Arbor, MI 48106-1346; 313/761-4700.

BACK ISSUES OF MACWORLD

Write to: Back Issues of Macworld, c/o Snyder Newell, Inc., P.O. Box 7046, San Francisco, CA 94120-9727; \$6 per issue (\$20 overseas). Prepayment in U.S. funds necessary. Make checks and money orders payable to Macworld Magazine.

MACWORLD EDITORIAL

MAIL OR COURIER Macworld Communications, Editorial Dept., 5th floor, 501 Second St., San Francisco, CA 94107; 415/243-0505.

AppleLink: Macworld1

CompuServe: 70370, 702 Fax: 415/442-0766

LETTERS TO THE EDITOR All written comments, questions, and suggestions regarding any aspect of the magazine are read by our editor. We reserve the right to edit all submissions; letters must include your name and address. Direct all correspondence (by mail or electronically) to: Letters to the Editor.

QUESTIONS AND QUICK TIPS Direct questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to: Quick Tips, Lon Poole. Please include your name and address.

CONSUMER ADVOCATE Been burned? Really steamed? Direct your concerns (by mail or electronically) to: Conspicuous Consumer, Deborah Branscum.

NEW PRODUCTS AND UPDATES Direct press releases and product announcements (by mail or electronically) and shrink-wrapped software upgrades (by mail or courier) to: New Products Editor.

BUG REPORT AND TURKEY SHOOT Wanna squish 'em? Hearing gobblers? Mail in nominations with description of problem, copies of correspondence with vendor or telephone contact notes (if any); and your telephone number, mailing address, and T-shirt size. Remember: Turkeys are flaws in conception or design, while bugs are defects or flaws in execution.

REPRINTS AND PHOTOCOPY PERMISSION Permission will be granted by the copyright owner for those registered with the Copyright Clearance Center (CCC) to photocopy any article herein—for personal or internal reference use only—for the flat fee of \$1.50 per copy of the article or any part thereof. Specify ISSN 0741-8647 and send payment directly to the CCC at 27 Congress St., Salem, MA 01970. Address requests for reprint orders and for permission to copy editorial for other purposes to: Reprints and Permissions, Editorial Dept.

WRITING FOR MACWORLD Please do not send us unsolicited manuscripts. If you're interested in writing for Macworld, send a stamped, self-addressed envelope along with a request for our writer's guidelines. Direct (by mail) to: Writer's Guidelines, Editorial Dept.

FOUNDER

David Bunnell

FOUNDING EDITOR

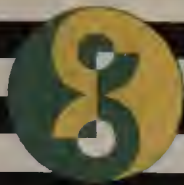
Andrew Fluegelman 1943-1985

Macworld is a publication of Macworld Communications, Inc. Macworld is an independent journal not affiliated with Apple Computer, Inc. Macworld, MW Lab, Desktop Critic, and Conspicuous Consumer are registered trademarks of International Data Group, Inc. APPLE, the APPLE LOGO, MAC, and MACINTOSH are registered trademarks, and MACLETTER is a trademark of Apple Computer, Inc. Printed in the United States of America. Copyright © 1992 Macworld Communications, Inc. All rights reserved. Macworld is a member of IDG Communications, the world's largest publisher of computer-related information.





UNCONDITIONAL
LIFETIME WARRANTY



THIRTY-DAY
MONEY-BACK GUARANTEE



TOLL-FREE
TECHNICAL SUPPORT

TECHWORKS™



WITH TECHWORKS MEMORY KITS YOU CAN RUN MEMORY-INTENSIVE
NEW PROGRAMS MUCH FASTER. ALL OUR MODULES UTILIZE HIGHLY
RELIABLE SURFACE MOUNT TECHNOLOGY AND CMOS MEMORY CHIPS.

GET MORE COLOR POWER FOR YOUR LC WITH TECHWORKS 512K VRAM CARD.

Power Up To Maximum Ram

MEMORY KITS	SIMM SIZES AVAILABLE							
	1MB	2MB	3MB	4MB	6MB	8MB	16MB	
MACINTOSH PLUS	•							
MACINTOSH SE	•							
MACINTOSH SE/30	•			•				
MACINTOSH II	•			•				
MACINTOSH IIX	•			•				
MACINTOSH IICX	•			•				
MACINTOSH IICI	•	•		•		•	•	
MAC CLASSIC	•		•					
MAC CLASSIC II	•	•		•				
MACINTOSH LC	•	•		•				
MACINTOSH IISI	•	•		•		•		
MACINTOSH IIFX	•			•		•	•	
LASERWRITER IINTX	•							
TI MICROLASER	•							
HP LASERJET	•	•		•				
PORTABLE	•		•					
QUADRA 700	•			•				
QUADRA 900	•			•		•	•	
POWERBOOK 100		•		•	•			
POWERBOOK 140		•		•	•			
POWERBOOK 170		•		•	•			
CARDS								
MACINTOSH LC	512K VRAM • LC FPU							
MACINTOSH IISI	ADAPTER CARD • ADAPTER CARD WITH FPU							
QUADRA 700/900	256K VRAM							
MACINTOSH IICI	CACHE CARD							

TECHWORKS ADAPTER CARD RUNS ALL SE-30 PRODUCTS
ON YOUR IISI. ALSO AVAILABLE WITH FPU
FOR FAST MATH.

HIGH SPEED CALCULATING FOR YOUR LC
WITH OUR LC FPU.

16 MEG MEMORY MODULE FOR HEAVY-DUTY HIGH-SPEED PERFORMANCE.

NEAR PHOTOGRAPHIC QUALITY IMAGES ARE ATTAINABLE
FROM ANY QUADRA WITH OUR NEW 256K VIDEO CARD

MORE POWER FOR THE POWERBOOK.™

AVAILABLE IN 2MB, 4MB, AND 6MB.

CALL ABOUT OUR MEMORY UPGRADE TRADE IN SPECIAL

FREE INSTALLATION KIT AND TORX TOOL PLUS
TOLL FREE TECHNICAL SUPPORT INCLUDED WITH ALL PRODUCTS.

CORPORATE PO'S ACCEPTED, ALL MAJOR CREDIT CARDS HONORED AND
VOLUME DISCOUNTS ARE AVAILABLE. FACSIMILE ORDERS: 512-794-8520.
TECHNICAL SUPPORT: 800-933-6113. BUSINESS LINE: 512-794-8533.

TECHWORKS, INC., 4030 BRAKER LANE WEST, SUITE 350, AUSTIN, TEXAS 78759-5319
TECHNOLOGY WORKS AND TECHWORKS ARE TRADEMARKS BELONGING TO TECHNOLOGY
WORKS, INC. ALL OTHER TRADE NAMES REFERENCED ARE THE PROPRIETARY SERVICE MARK,
TRADEMARK, OR REGISTERED TRADEMARK OF THE RESPECTIVE MANUFACTURER.

DIRECT

800-685-3682

Circle 131 on reader service card

NO MATTER WHICH MAC YOU OWN, DAYSTAR CAN MAKE IT BETTER.

DayStar products boost your Mac's performance and improve your productivity. We offer you great manuals, no risk guarantees, 100% compatibility, a 3 year warranty, upgrades, and unsurpassed toll-free support.

For The Macintosh LC... Advanced Capabilities.

Maximize your LC without spending a bundle. Even bring it to Quadra-level speeds.

Equalizer LC™ — Replace your antiquated 68020 processor and get what Apple put in the new LC II — the powerful 68030 processor. It also offers an optional math chip (which the LC II doesn't). You get full System 7, compatibility, virtual memory and faster math performance.

PowerMath LC™ — Put a math chip in your LC or LC II and speed up spreadsheet recalcs 500% or more!

For The Macintosh IIsi... More Speed & Slots.

For about the price of Apple's single-purpose PDS adapter board, add slots, math chips, acceleration and cache cards.

ComboCache IIsi™ — Get 40% more speed to go with your PDS adapter, an optional math chip and still have a slot left for another PDS board.

DualPort IIsi™ — Get a PDS adapter, a math chip, and another slot for a DayStar accelerator!

For The Mac IIsi, IICI and Quadras...

FastCache™ and QuadraCache™ — The low-cost cache card that puts the "zip" back in your Mac. Boosts performance 20-40%.



For The Mac LC, LC II, II, IIsx, IIsx, IIsi, IICI, SE, SE/30 and Classic...



Universal PowerCache™ — When you're ready for the ultimate in acceleration, turn to our award-winning PowerCache. We use the power and reliability of a 68030 processor (at 33, 40, or 50 MHz speeds) to offer performance gains up to Quadra-level speed. Our single, universal PDS design supports ten Macs*, and is inexpensively upgradable to our future 68040 accelerators.

For NuBus Macs... Break The Hard Drive Bottleneck.

DayStar offers you two ways to speed up applications that need fast hard drives.



RAM PowerCard™ — Put SIMMs on a NuBus card. Get a superfast internal RAM drive for one-fourth the price of an external RAM drive. Accelerates large files up to 300%.

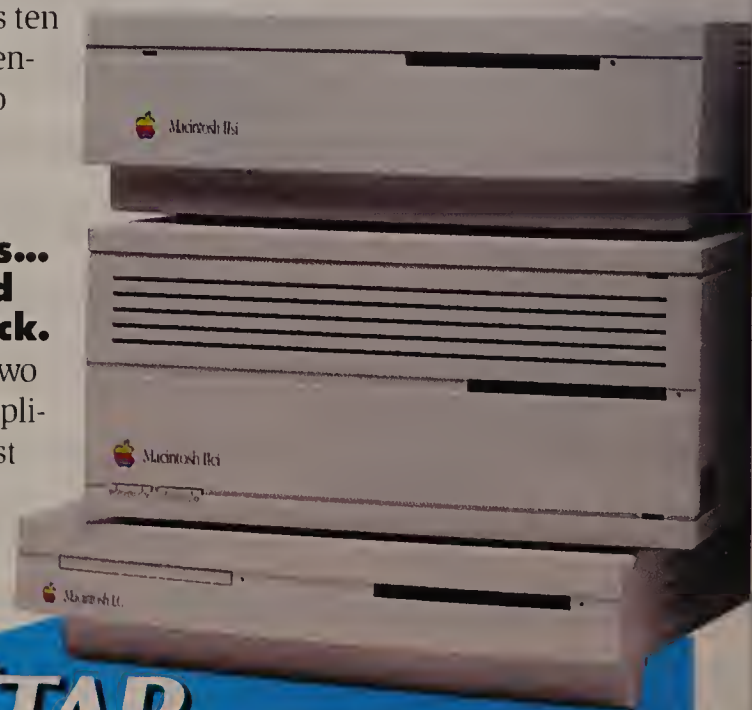
SCSI PowerCard™ — Puts new life into slow drives and removables. Disk intensive applications run up to 200% faster.

The Upgrades You Need.

Our Swap-Up program lets you upgrade your system as your needs change. Call us at the number listed below for details.

**Get all the details.
Call for an immediate fax!**

800-962-2077



*For the PowerCache, a simple adapter is required for all non-IIcx installations. IIcx model requires a socket installation that is free from DayStar.



DAYSTAR
DIGITAL

SEE US AT SEYBOLD
Booth #3105

5556 Atlanta Highway, Flowery Branch, GA 30542 Tel: (404) 967-2077, Fax: (404) 967-3018 This ad was completed on a Macintosh with DayStar

Also available on GSA Schedule #GS00K91AGS017

Circle 86 on reader service card

Other brands and product names are trademarks or registered trademarks of their respective holders. Product specifications are subject to change without notice.
© 1992 DayStar Digital, Inc.

MACWORLD

DISCOUNT COUPON

**Free
Software!**



Includes
Money Matters for
maximizing your
personal finances,
Project Leader, and
fun games like
Spacestation Pheta,
Glider, *Klondike*,
and lots more!

Save
58%

☐ 1 Year (12 issues) for \$19.95
That's a savings of 58% off the annual newsstand price of \$47.40.
With this coupon I'll save a total of \$27.45.

☐ 2 Years (24 issues) for \$37.90.

☐ Bill Me later!

NAME

COMPANY

ADDRESS

CITY, STATE, ZIP

Allow 4 to 6 weeks for delivery. Basic subscription price is \$30 for 12 issues. The annual cover price is \$3.95 per issue, \$47.40 annually. For Mexican subscriptions, please add \$18 per year for shipping. For Canadian subscriptions, add \$18 plus \$1.40 (7% GST). Add \$70 annually for all other foreign countries. CA residents add applicable sales tax.

4B7J3



NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1167 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

MACWORLD

Subscription Department
P.O. Box 51666
Boulder, CO 80321-1666



**Macworld
Discount
Coupon**

*See reverse side
for details*



MacBulletin

L A T E - B R E A K I N G N E W S

John Sculley and Bill Gates shared a podium recently to announce Apple-Microsoft collaboration on database connectivity. Sculley said Apple will extend its Data Access Manager to support Microsoft's Open Database Connectivity tools and will develop a Windows client for Apple's Data Access Language, which Microsoft will market. Gates added that Microsoft will develop Mac products for Apple's upcoming RISC-based computers.

Quorum Back in Port: Quorum Software Systems has dropped a suit filed against Apple to block Apple's threat of a copyright infringement suit. Quorum's products include tools to help developers port Macintosh software to Unix. Quorum says the agreement protects Quorum customers against litigation by Apple.

Accelerated video boards are now shipping from Radius (408/434-1010). The PrecisionColor 8Xj and the PrecisionColor 24Xk deliver 8-bit color for \$599 and 24-bit color for \$999, respectively. Radius also began shipping the PrecisionColor Display/20S, a version of its current 20-inch PrecisionColor Display/20 color monitor that now lets a Quadra run 24-bit color without an add-in graphics adapter board.

StrataType, from Strata (801/628-5218), is a tool for extruding text into three dimensions, adding bevels, and coloring the text with photo-realistic solid shaders. The letters' Bézier curves can be modified in a 2-D view, but not after they are extruded into 3-D. StrataType (\$295) works with PostScript and TrueType fonts and can import Adobe Illustrator files.

The QMS 860 Print System is a 600-by-600-dpi printer that produces 11-by-17-inch output. It includes a RISC processor and its own multitasking operating system for controlling emulations, print queuing, and other complex functions. QMS (205/633-4300) expects to ship the printer in mid-August at a list price of around \$4500.

VideoSpigot Pro dropped in price, and SuperMac (408/245-2202) added to it the capability to transfer QuickTime movies to videotape. The new suggested retail price for the real-time digital-video board is \$1499, down from \$1599.

Synergy Software (215/779-0522) is shipping new versions of VersaTerm and VersaTerm Pro that provide MacTCP support for Serial Line Internet Protocol, making it possible to access TCP networks via modem. VersaTerm 4.6 lists for \$149, and VersaTerm Pro 3.6 lists for \$295.

Nikon Electronic Imaging (516/249-2121) plans to market ImageAccess, an image-cataloging database. ImageAccess (\$495) provides descriptive text fields that can be searched; can archive TIFF, PICT, EPS, and JPEG-compressed files; and, using a Nikon LS-3510AF scanner, can batch-scan slides and store a thumbnail of each image in the database.

PowerBooks get some rays with the SolarPower, a solar panel from Microtech International (800/626-4276). The \$189 panel clamps onto the PowerBook and, according to Microtech, provides enough power to extend battery life significantly, depending on available sunlight. SolarPower is expected to ship in October. [m](#)

Think of it as an airbag

AppleCare®



for your Macintosh.

It's AppleCare®. The only extended service plan for Apple owners that's backed by Apple. And it's your best cushion against repair costs.

Should an unexpected problem develop, you know that your equipment will be repaired by the people who understand Apple products inside and out: Apple-trained professionals who use genuine Apple parts. So you'll be assured of the quality of the service.

For all this peace of mind, you pay just a single annual fee — a reasonable one compared to the cost of typical computer system repairs. From then on, while AppleCare remains in effect, you won't pay a penny more for any covered repair. Not for parts. Not for labor.

With AppleCare, service is available from any authorized Apple reseller nationwide. And you're protected against virtually every type of computer problem arising under normal circumstances. Fixing a major hard disk problem for most computers typically can run as much as \$600. But with AppleCare, it's taken care of. You can enjoy AppleCare protection for most of your Apple equipment, including CPUs, printers, monitors, external drives, and scanners.

Naturally, Apple builds everything to rigorous standards. And the way your computer system keeps going, day after day, is testimony to that. But if something should go wrong, we want to be the ones to set it right.

To receive more information about AppleCare, call the toll-free number below. Or just ask your Apple reseller.

If anything happens to your system, there's nothing like AppleCare to soften the blow. And protect the power that Apple has always given you. The power to be your best.®



AppleCare is the way to budget for computer repair and maintenance in advance. It's available for most Apple products, old and new models alike.

Apple Care®

Call 1-800-365-3690, ext. 930.



The Experts in Accessories

Manufacturing Company, Inc.



1449 497A
TVSS Listed

CURTIS



Sleek stackable design with built-in swivel base (adjust monitor for better viewing.)

Built-in non magnetic compartment allows easy storage and access of 5 1/4" or 3 1/2" diskettes.

5 AC outlets, push-button switches on front panel, phone line jacks and patch cord included, resettable circuit breaker

Lifetime Warranty

I'm In Command!

With The Curtis Command Center

Take command with the new Curtis Command Center. It puts guaranteed protection and complete control of your entire system at your fingertips.

The new Curtis Command Center protects your system against surges in AC power and phone lines—surges that can cause costly damage to your computer and telephone components, scramble your software, and destroy valuable data.

• **Complete Control**—One-touch of the Master Switch powers up

entire system while discharging built-up static electricity. Independent push-buttons provide individual control of computer and 4 peripherals.

• **Guaranteed Protection***—UL 1449 TVSS Lowest Voltage Rating of 330v for surge suppression, CSA approved, and the Curtis Lifetime Warranty. Plus EMI-RFI filtering, static electricity protection, and complete phone line surge protection for fax/modem/telex/etc.

Don't leave your system unprotected—take command with the new Curtis Command Center.



Curtis products are available worldwide.
for more information call (603) 532-4123 Ext. 242

Manufacturing Company, Inc.

CURTIS

30 Fitzgerald Drive, Jaffrey, NH 03452-1931

*All surge protectors are not lightning arrestors and will not provide protection against a direct lightning strike.

© Curtis Manufacturing Company, Inc.

Circle 20 on reader service card

Printer's Ink with a C

BY JERRY BORRELL

THE SIGN ON THE WALL OF the building says Books, Espresso, Magazines. Printer's Inc. is a bookstore located on Castro Street in Mountain View, California. Don't ask me why I go there, since I live 35 miles away, in San Francisco. Perhaps it's because when I lived in Silicon Valley eight years ago and was considering the job as editor-in-chief of *Macworld*, I went there to find a copy of the magazine. Perhaps it's because Printer's Inc. is one of those increasingly rare (at least in California) bookstores where you can buy a cup of coffee and read the books. I didn't notice *Macworld* on the shelves there during my most recent trip, but on my visit eight years ago *Macworld* fit in with the other non-mainstream magazines. In fact, there were four different issues sitting on the newsstand there in 1985. They somehow fit in with the atmosphere of the store, which invites you to sit and talk about anything from travel to philosophy to computers.

There aren't too many bookstores like that anymore. There used to be one on Chestnut Street in San Francisco. It had a little restaurant in the back and bookshelves up in the front. I would leave work at 8 or 9 p.m. and wander in for a late meal, and then over the course of dinner select a few books. I used to wonder whether the proprietors minded the crumbs in the books I looked at and didn't buy. But I also recall buying some extra books just to encourage them to maintain their policy. Another favorite place was the bookstore in Washington, D.C.'s Georgetown, on a street off Wisconsin Avenue, that I used to visit with my now-15-year-old son to buy Asterix and Obelix comic books. It's not there anymore. But the Harvard Bookstore on Newbury Street in Boston, where I lived for two years, still exists—a place to eat or buy a coffee and read books. There used to be a bookstore on Red Road in Miami, but that's gone now, moved to a shopping center. A lot of bookstores seem to have moved into shopping centers.

Now that I think about it, there are very few bookstores that I really enjoy anymore. Ones that really draw me in. Most bookstores today are more orga-

nized. Compact. Efficient. Some of the smaller chains are attractive, such as A Clean Well Lighted Place for Books in the San Francisco Bay Area. And City Lights, an independent local bookstore, still draws me in.

I don't know anything about the economics of selling books, but several things seem obvious in the stores I visit. Sales seem slow. Rents, and therefore the cost of doing business, must be high in modern shopping malls. The profit margin can't be much, especially given the trend toward book discounting. There are an enormous number of titles. And the range of titles or topics is amazing. I always admire the dedication that keeps bookstore shelves so full and well organized.

At the same time, it seems that people are reading less, with many watching television rather than reading. I wonder if the trend toward bookstore chains has been shaped by these factors. More important, I wonder, what will the trend become as even more information, like electronic magazines or books, is not distributed by bookstores? Several things will happen; one of them is likely to be the demise of the neighborhood bookstore.

Will Phone Jacks Replace Bookstores?

IN THE JUNE ISSUE I SUGGESTED THAT readers will have access to magazines like *Macworld* via phone lines before 1992 is over. Not just text versions or online services, but versions using full-blown graphics, video, and sound. And multilingual versions as well. In that scenario, a phone jack could begin to displace bookstores, or put enough additional economic pressure on this already stretched-thin distribution channel to cause even further changes.

It's not just the viability of a neighborhood bookstore, or the local Brentano's, Waldenbooks, or other bookstore-chain outlet that will be affected by the delivery of electronic magazines and books. College bookstores will change as well. My undergraduate experience was

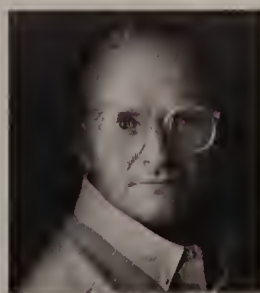
shaped in part by my college bookstores. I used to scan the shelves of those bookstores to determine if a class would have sufficiently interesting reading for me to enroll. I would browse in the aisles reading texts or looking at books I could not afford to buy.

The inevitable changes in book distribution will reach libraries as well. I'm fearful of what may happen to libraries because I have a certain reverence for them. Libraries have worked so hard over the last 20 years to become more than a place for books, that they now successfully fulfill a multipurpose role of a community resource, a haven for children, a meeting place, a place to access computers for those normally without access, and much more. But without books, libraries will lose their central purpose. And just as major cities experienced the flight of the middle classes, so too will libraries experience the flight of those seeking information as the information they want becomes available in the home via phone lines. And as the people who vote to fund libraries see them as less useful for the needs of their children, they will be less likely to support them.

I recognize that's a very pessimistic conclusion about what is likely to happen. But it's well grounded. There are fewer bookstores today that I can treat like a second home. Libraries, at least in California, have been reducing hours, staff, and collections for a decade. And there are, of course, many citizens who have never had access to the kinds of bookstores and libraries I'm even talking about. How often do you find even Waldenbooks bookstores and multimedia-rich public libraries in ghettos?

Changes in Information Consumption

IT'S BEEN PUBLICIZED FOR A while that the average American household consumes six hours of television per day. There are fewer newspapers in the United States now than at the turn of the last century. Our information sources have changed. Companies such as



*What happens to
our society
when books and
magazines
are electronic?*

Whittle Communications want to change information distribution through advertising—by offering schools, for example, information along with paid advertising. There's a trend in newspapers, such as *USA Today*, toward replacing articles with graphics. A trend for all magazines to make articles shorter. A trend in broadcasting toward airing stories in image and sound bites in place of substantive reporting. For me, there is little question that our consumption of information is chang-

ing. Given such an environment, I wonder, as content development begins for electronic magazines, who will be the first to succeed—*National Geographic* or "Entertainment Tonight." Those into the market first will define what people come to expect, and I fear that something like "Entertainment Tonight" or other, commercial-like content is just as likely to be the outcome of electronic publishing as is a multimedia version of "Nature" narrated by George Page.

The Craft of Publishing

AS THOSE OF US WITH KNOWLEDGE and skills in traditional publishing begin to explore using video to supplement our stories, we have precious few role models. But I think we can actually improve on the original printed version of a story. Take *Macworld's* story "How to Keep Your Mac Current" (May, 1992), for example; adding video to that article could show you how to open the Macintosh to put in SIMMs—unlike text, which can only describe the process. And with sound to supplement the video, viewers can hear the sharp snap that a SIMM module should make when it is placed properly onto the Mac's system board.

As print editors, our video production skills are minimal, but so is the support of QuickTime for full-motion video. The limitations of the Macintosh mask our limitations in using video as we explore this medium. I'd like to think that we are going to bring the patience and dedication of monks working on illuminated manuscripts to any new electronic magazines, but time is money. The pressure to publish and succeed will compete with the desire to produce content ideally suited to new technologies.

Finding Information

THE CHANGE IN INFORMATION DISTRIBUTION brings other troublesome issues to the fore, including the issue of choice and the issue of access.

The concept of choice: Cable TV really elevated this issue, by offering viewers a wide selection of programming. Another aspect of choice that cable brought to the public is the ability to choose to view programs without advertising. Home Box Office legitimized the concept of advertising-free programming. I would like to see the HBO model for electronic magazines. I believe some people will pay a premium to avoid advertising. Particularly if they have the ability to watch advertising if they want—the electronic-magazine equivalent of the shopping channel is being pursued by most people discussing electronic magazines. For those of you who want this, never fear. Electronic magazines will offer readers even more choices, and more flexible choices. They'll raise the cable-initiated concept of choice to a much higher level. Not only will you pick magazine articles based on your interest, but also you'll be able to pick the advertising that you want based on what you desire to purchase.

The concept of access: One evening while I was busy pondering what would happen to people without the economic ability to access electronic magazines and

continues

To Go Forward, You Must Backup

"The high-end backup standard against which all others are judged."

—*MacWEEK*, Dec. 1990

"If you are looking for a fast backup system that can help you effectively manage the backup process, we recommend Retrospect Remote."

—*MacUser*, Aug. 1991

"Because of its profusion of features, Retrospect Remote is the cream of the network-backup crop."

—*Macworld*, Nov. 1991



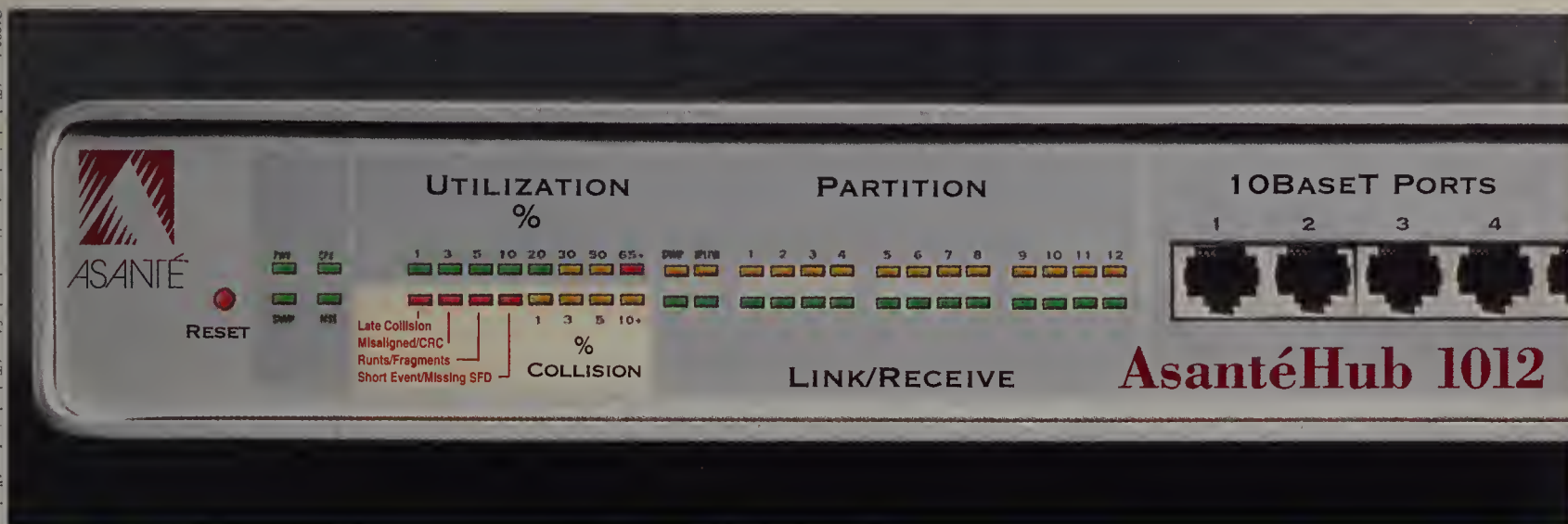
Dantz

DANTZ DEVELOPMENT CORPORATION

1400 Shattuck Avenue, Berkeley, CA 94709 • 510/849-0293 • 510/849-1708 FAX

AVAILABLE AT RETAILERS AND MAIL ORDER OUTLETS WORLDWIDE

Circle 26 on reader service card



We call it a smart hub. You'll call it a smart choice.

The AsantéHub™ 1012 is a 12-port, intelligent 10BaseT hub that offers all the features and benefits of a high-end enterprise hub for a departmental price.

Combining the AsantéHub 1012 and AsantéView™ management software creates the industry's first smart hub with both in-band (SNMP) and out-of-band network management for both PCs and Macs® that uses the same graphical user interface. That means you can graphically monitor and control your entire network, locally or remotely, from your choice of computer platform.

Smart Remote Network Management.

AsantéView gives you direct control of your network at the hub and port levels. The software can even trigger your pager to give you the flexibility to solve your office network problems when you're not there.

The AsantéHub includes a built-in expansion slot for internetworking option cards. Asanté offers an in-band SNMP hardware module as an option for this slot. The hub also features an RS-232 port for remote dial-up access, and both RJ-45 and RJ-21 connectors for direct-to-computer or

punch-down block connections.

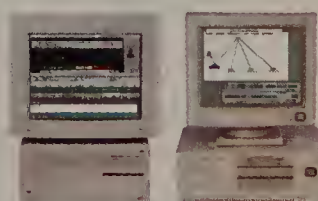
There is also a 3-in-1 "13th" port for interconnecting multiple hubs with backbone cabling. This port includes BNC, RJ-45 and AUI connectors supporting a variety of cabling media.

Asanté. The Smart Choice.

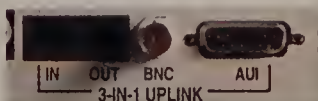
Asanté has built a reputation for producing compatible, reliable and flexible networking products. We offer a full family of Ethernet® and Token Ring adapter cards for PCs and Macs. And a full line of 10BaseT hubs. We're the networking company of choice because we give you more choices.

For more specific smart hub questions, please call us today at 800-523-3115.

Resellers: Asanté products are available from Ingram Micro, Merisel, and Tech Data.



[In-band or out-of-band network management from a Mac or PC, using the same graphical user interface.]



[3-in-1 auto-switching redundant backbone port with software override capability.]



[Remote out-of-band management lets you manage your network from anywhere in the world.]



books, I began to remember what access to books and magazines is like today. I remembered, in particular, a report I wrote while working in the Library of Congress on the notable lack of correspondence between the entries in the card catalog and the books actually on the shelf in the library.

I loved the stacks, the seemingly endless miles of shelves housing the millions of volumes in the library. They were my downfall. I lost months of evenings perus-

ing subjects that I shall never have time to go back to. Still, I learned a great deal about the problems faced by our nation's library of record. That many books are missing—stolen, lost, misfiled. Just plain gone. I stood in the gallery of the main reading room of the Library of Congress more than once as some crestfallen researcher learned that a request for books could not be filled because there was no book on the shelf.

That reminded me of the times that I

have gone to a bookstore, as I did recently looking for material on ancient Sumer (what is today southern Iraq), only to realize that despite all those gleaming shelves of beautifully crafted books, there was nothing on the topic I wanted. There was a short passage in a history of the Near East. A few pictures of southern Iraq in a coffee-table book. A definition of Sumer in an unabridged dictionary. I thought about the many times I have combed the shelves of bookstores and not found what I wanted.

Electronic books and magazines will change that. No more misfiling. No more missing books checked out by someone before me. Or an empty magazine slot on a rack. I'll have the ability through keyword searches to electronically retrieve all of the materials I mentioned above: the definition, the pictures, the historical passage. In fact, I'll find materials that would have been inaccessible to me on a bookshelf. I'll pull material from such a wealth of sources that even where there is no book on a particular topic, I'll be able to pull together so much that I may have the information I need. A kind of self-created, if unedited, book.

In that light, access to information will improve dramatically with electronic books and magazines. And I won't have to drive all over the Bay Area looking for a book on my topic.

What's It All Mean?

AS ELECTRONIC BOOKS AND MAGAZINES accumulate in data banks across the nation, information consumption will change again.

Some people will simply never see the books and magazines that we are creating—a situation much worse than not seeing HBO or MTV on a cable channel. But I suspect that people who can't watch "Yo! MTV Raps" now are unlikely to have access to Macworld Interactive either. People who are finding their public library doors closed are also unlikely to be able to hook up their computers to phone jacks and download a multimedia history of the Civil War for their children. Libraries will go on trying to provide the public with access to books and magazines, but the truth is that some books will simply never appear in print. Most new electronic magazines and books will not even be suitable for print publications.

Saddest of all, there will be even less likelihood that we'll be able to sit in a quiet bookstore over coffee and tell each other what is happening. In the 1890s American society was connected by new technologies. The technology of the 1990s is likely to make American society less connected. **m**

Nervous about your next breakdown?



It's time you had Peace of Mind, the most complete Macintosh hardware diagnostic available. With over 100 tests, you can check out your system from RAM to mouse.

The icon-driven control panel makes Peace of Mind software quick and easy to use. You can run a fast check or give your Mac a real workout with a comprehensive suite of hardware tests. Whether you're a systems professional or a new Macintosh owner, you deserve complete Peace of Mind.

Call 1-800-695-4239 to order. List Price \$149. Now \$89, until 10/31/92.

Peace of Mind

Diagnostic Software

Polybus Systems Corporation, P.O. Box 7600, Nashua, NH 03060

Circle 63 on reader service card

Triple Crown Winner.

In the 1992 hard-drive triple-crown, La Cie™ finished First, First, First. Never before has a single company swept all three Macworld World Class Award fixed-drive categories. And that's not all! La Cie's Silverscanner is also a 1992 Macworld champ. Thanks to all those Macworld readers who named La Cie the best bet in mass storage solutions. You're the reason we work so hard to win!



The 1992 Macworld
World Class Awards

Best Hard Drive!
(under 80MB)

Best Hard Drive!
(80-200MB)

Best Hard Drive!
(over 200MB)

Best Color Scanner!
La Cie Silverscanner

"...I'm now taking the safer
course of buying from
corporate-owned companies
such as Quantum-backed
La Cie..."

MacWeek, February 1991

For a sure winner, breeze to a phone and call toll free.

LACIE
LIMITED
A QUANTUM COMPANY

800-999-3919

6 a.m.-6 p.m.PST Mon.-Fri.

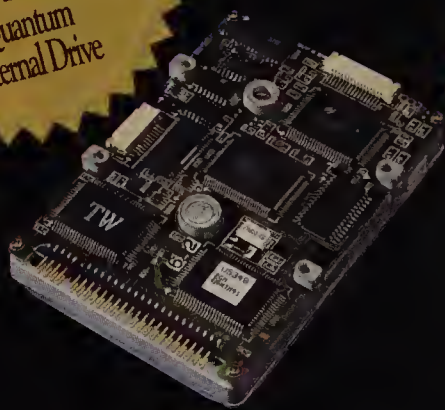
International 503-520-9000 Fax 503-520-9100

VISA, Mastercard, C.O.D. and approved purchase orders accepted*

We're the odds-on

Smart people know how to pick a winner! That's why Macintosh users voted La Cie their favorite in all three 1992 Macworld World Class Award fixed-drive categories. For across-the-board quality, innovation, service and value, La Cie hard drives are the smart-money bet!

NEW!
120MB Powerbook
Quantum
Internal Drive



FREE!
Powerbook opener
\$19.95 value*

La Cie ZFP Drive



La Cie Cirrus



La Cie Tsunami
Portable and fast,
starting at under 2.75 lbs.

FREE!
Silverlining™
\$149 value*

*Call for details on terms, conditions, limited money back guarantee and free offers. Price does not include shipping. Add sales tax where applicable. ZFP, ZFP Plus, Cirrus, Tsunami, PocketDrive, PocketDock, ExpressDrive, Silverscanner, Silverlining, La Cie and the La Cie logo are trademarks of La Cie, Ltd., a Quantum Company. All other trademarks are the property of their respective companies. All prices, specifications, terms, descriptions, products and services herein are subject to change without notice or recourse. Copyright 1992 La Cie, Ltd. 8700 SW Creekside Place, Beaverton, OR 97005. Phone: (503) 520-9000, Fax: (503) 520-9100. All rights reserved. Printed in U.S.A.

favorite.

Tsunami and Cirrus Drives

Winner of Industrial Design's famous ID award, these beautiful quiet drives pack power beneath sinuous lines.

Internal & ZFP™ Drives

Economical, reliable and well-built.

Drive Size	Internal	External
50MB Quantum LPS	\$229	\$299
80MB Qntm 2 1/2" for Powerbook	\$449	PocketDrive
100MB Quantum LPS	\$369	\$469
120MB Quantum LPS	\$419	\$519
120MB Qntm 2 1/2" for Powerbook	\$699	PocketDrive
240MB Quantum LPS	\$679	\$779
425MB Quantum Maui	\$1019	\$1119
650MB Seagate	\$1649	\$1749
1.2GB Seagate	\$1899	\$1999
1.6GB Seagate	\$2799	\$2949

The La Cie Advantage

With every La Cie hard drive you get:

- FREE Silverlining (\$149 value)
- FREE switchable termination (\$50 value)
- Universal power supply
- Approved by FCC, UL, TUV, VDE and CSA for legal safe operation and industrial grade quality

\$439
120MB ZFP
Quantum Magnum*

New!
30 Day
Money Back
Guarantee*

The 1992
Macworld
World Class
Awards

Best
Hard
Drive!
(under 80MB)

Best
Hard
Drive!
(80-200MB)

Best
Hard
Drive!
(over 200MB)

Best
Color
Scanner!
La Cie
Silverscanner

"I like the
La Cie Drives
Best"

David Ashbaugh

Put your money on a sure winner and call toll free.

LACIE
LIMITED
A QUANTUM COMPANY

800-999-3919

6 a.m.-6 p.m. PST Mon.-Fri.

International 503-520-9000 Fax 503-520-9100

VISA, Mastercard, C.O.D. and approved purchase orders accepted*

The
ULTIMATE
in portability
from 8 oz!

We're born

We love to run! For you and with you! When it comes to fast-moving mass storage, La Cie's stable of portable, removable and removable media drives has our competition beat by a mile. Pack a palm-sized PocketDrive™ or pick our light weight Cirrus Optical. Only the quality and service is heavyweight. We've got the Macworld World Class Awards to prove it! As a Quantum company, we'll run to your assistance for years to come!

La Cie PocketDrive System



La Cie PocketDrive



La Cie DAT Drive



La Cie Cirrus Optical Drive



La Cie Tape Drive



La Cie ExpressDrive™



*Call for details on terms, conditions, limited money back guarantee and free offers. Price does not include shipping. Add sales tax where applicable. ZFP, ZFP Plus, Cirrus, Tsunami, PocketDrive, PocketDock, ExpressDrive, Silverscanner, Silverscan, Silverlining, La Cie and the La Cie logo are trademarks of La Cie, Ltd., a Quantum Company. All other trademarks are the property of their respective companies. All prices, specifications, terms, descriptions, products and services herein are subject to change without notice or recourse. © Copyright 1992 La Cie, Ltd. 8700 SW Creekside Place, Beaverton, OR 97005. Phone: (503) 520-9000, Fax: (503) 520-9100. All rights reserved. Printed in U.S.A.

to run.

La Cie PocketDrives

Quantum power "to go."

40MB PocketDrive incl. T-connector	\$349 \$299
80MB PocketDrive incl. T-connector	\$549
120MB PocketDrive incl. T-connector	\$799
Optional PocketDock Cable	\$99
Extra T-Connector	\$59

La Cie Optical Drives

Reliable, fast and economical.

128MB 3 1/2" Optical	\$1599
----------------------	--------

La Cie ExpressDrive

The ultimate in data security. Drives are both upward and downward compatible.

ExpressDrive Chassis	\$399
50MB Quantum LPS Drive	\$399
100MB Quantum LPS Drive	\$549
120MB Quantum LPS Drive	\$799
240MB Quantum LPS Drive	\$949

La Cie Tape Drives

155MB Tape Drive	\$649
1.3-2.0GB DAT Drive	\$1399

The 1992
Macworld
World Class
Awards

Best
Hard
Drive!
(under 80MB)

Best
Hard
Drive!
(80-200MB)

Best
Hard
Drive!
(over 200MB)

Best
Color
Scanner!
La Cie
Silverscanner

"Superb service
and product."
Mike Basham

FREE!
Silverlining™
\$149 value*

New!
30 Day
Money Back
Guarantee*

FREE!
Retrospect
\$249 value*

For portability to go the distance, sprint to a phone and call toll free.

LACIE
LIMITED
A QUANTUM COMPANY

800-999-3919

6 a.m.-6 p.m.PST Mon.-Fri.
International 503-520-9000 Fax 503-520-9100

VISA, Mastercard, C.O.D. and approved purchase orders accepted*

FREE!
Read-It OCR Pro!
\$595 value*

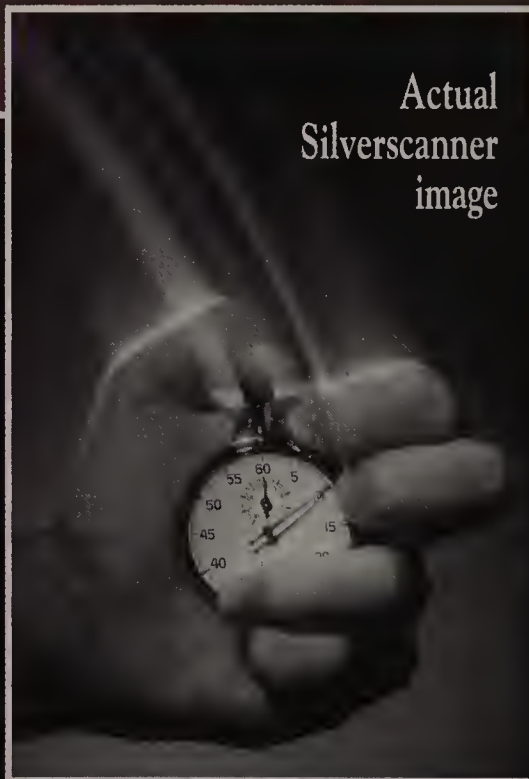
It's a photo

You made Silverscanner™
number one. And, we're still
riding hard for you! In the
high-stakes race of color
scanning, La Cie remains way
out in front! Our Silverscanner
is more versatile, more capable,
more colorful than ever before.
And when it comes to service,
La Cie always finishes first.
Why gamble on anything less.



Actual Silverscanner image

© Pennington



Actual
Silverscanner
image

La Cie Silverscanner
1200 dpi at 100%

600 dpi

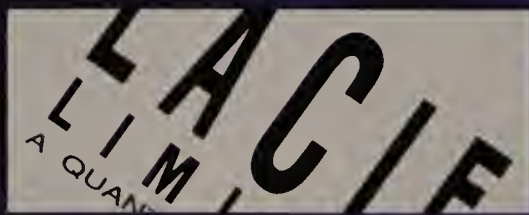
Microtek 600ZS

400 dpi

Howtek Scanmaster 3

1200 dpi

La Cie Silverscanner



*Call for details on terms, conditions, limited money back guarantee and free offers. Price does not include shipping. Add sales tax where applicable. ZFP, ZFP Plus, Cirrus, Tsunami, PocketDrive, PocketDock, ExpressDrive, Silverscanner, Silverscan, Silverlining La Cie and the La Cie logo are trademarks of La Cie, Ltd., a Quantum Company. All other trademarks are the property of their respective companies. All prices, specifications, terms, descriptions, products and services herein are subject to change without notice or recourse. Bundles in U.S.A. only. Ad design and production on Macintosh by Graphic Witness. Copyright 1992 La Cie, Ltd. 8700 SW Creekside Place, Beaverton, OR 97005. Phone: (503) 520-9000, Fax: (503) 520-9100. All rights reserved. Printed in U.S.A.

finish!

La Cie Silverscanner

Our Silverscanner is so good, we used it to produce this ad. Clean your glasses and take a look. Gorgeous color. Fine image detail. Excellent tonal range. Very high resolution. It's all there. The proof is right in front of you! Bet on the Silverscanner.

- 24 bits, one pass, up to 1200 dpi
- Wide dynamic range
- Lightning fast scanning
- Color dynamic previews
- FREE Silverscan™ software plug-ins



La Cie Silverscanner

La Cie Silverscanner
with Color It! and
Read-It O.C.R. Pro!

\$1399

La Cie Silverscanner
with Photoshop, ColorStudio
and Read-It O.C.R. Pro!

\$1899

The 1992
Macworld
World Class
Awards

Best
Hard
Drive!
(under 80MB)

Best
Hard
Drive!
(80-200MB)

Best
Hard
Drive!
(over 200MB)

Best
Color
Scanner!
La Cie
Silverscanner

"The choice is
clear . . . buy
the La Cie
Silverscanner."

Macworld, June 1991

New!
30 Day
Money Back
Guarantee*

For results that will put you in the winners's circle, call us toll free.

LACIE
LIMITED
A QUANTUM COMPANY

800-999-3919

6 a.m.-6 p.m. PST Mon.-Fri.
International 503-520-9000 Fax 503-520-9100

VISA, Mastercard, C.O.D. and approved purchase orders accepted*

The value of a thoroughbred.



When it comes to world-class speed and performance, nothing eclipses the form and function of a true thoroughbred. At La Cie, our goal is to make each and every product a thoroughbred. From the sleek lines and dainty footprints of our award-winning cases to the power of our technological muscle, La Cie builds champions that leave the competition in the dust. And as a Quantum company, we have the financial strength and staying power to bring you future generations of winners. For unbeatable technology and support, La Cie's the winning pick. You can bet on it.

Win place and show! Call us toll free.

LACIE
LIMITED
A QUANTUM COMPANY

800-999-3919

6 a.m.-6 p.m.PST Mon.-Fri.

International 503-520-9000 Fax 503-520-9100

VISA, Mastercard, C.O.D. and approved purchase orders accepted*

Letters

OCTOBER 1992

Protest Defective Displays

I READ THE *CONSPICUOUS CONSUMER* column (July 1992) and immediately got hot. The PowerBook 170's voided-pixel problem is much more severe than the article indicates. Having personally bought more than three dozen PowerBook 170s since December 1991, I can tell you that only three had no voided (white) pixels. All the others had from one to five voided pixels, most in the center of the display.

My experience is that the vast majority of PowerBook 170 owners do not even recognize the existence or severity of the voided pixel problem, and if they did, they would be raising as much hell about having been sold a defective display as the people you referred to in your column.

My advice to PowerBook 170 buyers with voided pixels is to do what I have done: return the units for a refund or exchange, protest credit card charges, stop payment on checks, raise hell with Apple corporate headquarters, and alert potential buyers to the problem so they can check the displays before they pay. If all else fails, go to court. You'll win a refund or a replacement plus reasonable attorney's fees and court costs.

*Robert Dattore
Maitland, Florida*

Memory Hogs

IT'S TOO BAD STEVEN LEVY SINGLEDED out Microsoft for creating a monster out of what was once a fast, full-featured word processor (*The Iconoclast*, July 1992). He could also have pointed out how Aldus took a perfectly good piece of presentation software and turned it into an unwieldy, unforgiving beast called Persuasion 2.1. I am stunned by how miserable this new version can make my workday. But there's no going back—2.1 documents can't be saved in 2.0 format, and everyone else in our firm has upgraded.

I think we are beginning to see the limits to the usefulness of marketing input in software design. For years we have been told that Microsoft, Aldus, and other companies with similar reputations have listened to the customers and added new features galore at their behest. Now we have these omnibus programs that are inimical to the practical people who made them popular in the first place, since one of the most practical features of any software is efficiency. The problem is, it's easy to persuade companies to add to their next version; how are you going to get them to subtract?

*Aaron Barnhart
Evanston, Illinois*

BEING A PART-TIME USER OF Microsoft Word 5.0, I read with amusement Steven Levy's "Livin' Large." I say I'm a part-time user because even with my IIfx, 20MB of RAM, and a 210MB hard drive, I find Word 5.0 to be a sluggish hog—so much so that I use it only out of necessity. Annoying traits, such as overzealous screen-updating (every time a letter is typed) and torpid scrolling, make Word such an inefficient sloth, I'd rather use the story editor in Aldus PageMaker to input new text.

*Andy Hong
Cambridge, Massachusetts*

STEVEN LEVY IS AMONG THE ANNOYING group of Mac whiners that has me fed up. Rather than marvel at the products companies such as Apple and Microsoft continue to develop and improve, Levy only seeks to complain about and amplify the trivial.

Get a life. I also have a Mac IIfx. Even with five applications on the original 40MB hard drive, my Word 5.0 always works perfectly. The only space problem was the amount of paper and ink wasted on your long-winded commentary.

*Alan Trudell
Anaheim Hills, California*

continues

**A BIT
MAP.**



**A BIT
BETTER.**



At only \$69.95, the benefits of JAG™ software are quite clear. Just take any color PICT or PICS image created in any Macintosh® paint, illustration, 3D, animation, multimedia or photo-retouching program. Run it through this simple-to-use utility and you'll see smoother, crisper 8 and 24 bit images in seconds. Better yet, you'll save quite a bit of money—\$30—with this offer.

**Call 800•846•0111 and order
JAG for only \$69.95.***



*Plus shipping and applicable taxes. Suggested retail price is \$99.95. JAG is a trademark of Ray Dream, Inc. Macintosh is a registered trademark of Apple Computer, Inc.

Circle 80 on reader service card

New Mac Powerbook 170/140 Battery with 25% More Run Time



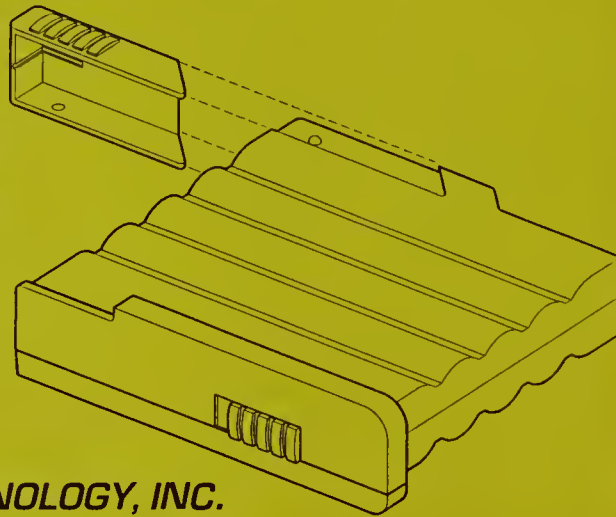
For Only \$89.95

QUICK-LOCK FEATURES

- Fast insertion and removal

HARD PLASTIC COVER

- Prevents the contact shorting problems.



BTI BATTERY TECHNOLOGY, INC.
5700 Bandini Boulevard, Commerce, CA 90040

1(800) 982-8284

Open Monday – Friday; 8:30 am – 5:00 pm PCT

Tel: (213) 728-7874 • Fax: (213) 726-3897 Fax Orders are Accepted

Payment-Accepts Visa or Master Card \$4.00 Service Charge for COD. Shipping-No shipment Charge for order over \$ 500. Prices & Conditions are subject to change

DISTRIBUTORS & DEALERS WELCOME

Circle 198 on reader service card

new

Hard Disk ToolKit™

Personal Edition



**Improve performance and make
any drive System 7 compatible.**

Format, partition, password protect, and test
any SCSI hard drive, SyQuest® drive or optical drive.



FWB Software, Inc. 2040 Polk Street, Suite 215
San Francisco, CA 94109 Ph: 415-474-8055 Fax: 415-775-2125

Circle 27 on reader service card

PLI's Infuuity Floptical 21MB should have received a 3-star rating:

Infinity Floptical 21MB



(Reviews, September 1992). The Floptical 5020FL from Liberty Systems, which should have received a 1-star rating, is no longer available. The slow performance of the Liberty Floptical 5020FL was due to the power supply and not FWB's software.

Tempo II macro software and an RJ-11 cable are no longer included with Key Tronic's MacPro Plus keyboard ("Input Alternatives," June 1992).

Marianne Carroll's book is titled Marianne Carroll's Super Desktop Documents (Insights, July 1992).

MacLand offers toll-free technical support but no extended-warranty plans ("Low-Capacity Drives," August 1992). It also offers a 105MB Quantum-based drive.

The U.S. version of Architrion's Tech 2-D is called AEC Draw; Syntrion will be replaced with rendering technology licensed from Ray Dream; Unic's U.S. office is at 617/731-1766 (News, August 1992).

The RasterOps QuickPak board will begin shipping in late August or early September, and its price has not yet been set (News, August 1992).

La Cie offers a one-month money-back guarantee ("Low-Capacity Hard Drives," August 1992). Its 105MB drive uses a Quantum mechanism. Dealer sales are available only outside the United States.

Backup programs cannot back up to CD ROM drives ("Low-Capacity Hard Drives," August 1992).

Delta Tao Software's number is 408/730-9336 (Reviews, August 1992).

Truvel's number is 703/742-9500 (New Products, August 1992).

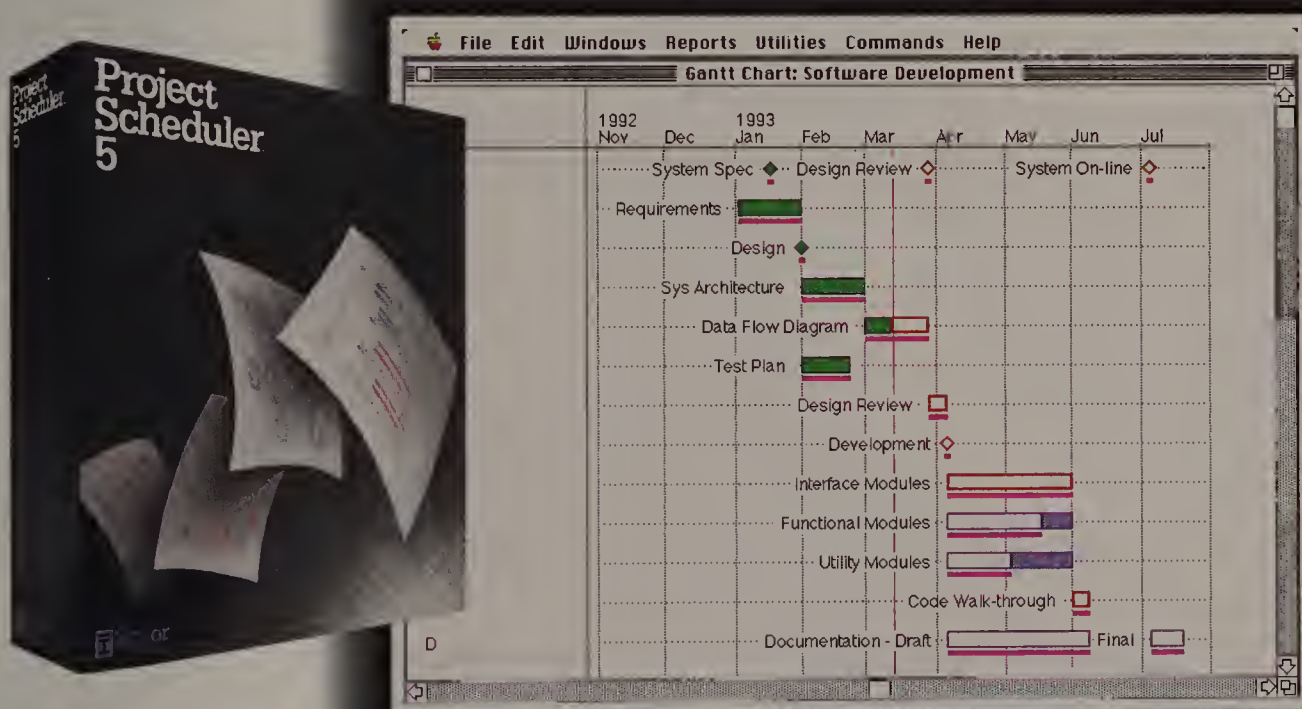
In Editors' Choice ("The Bigger Picture," September 1992), the E-Machines 8-bit video board that sells for \$449 should have been the DoubleColor SX. The Futura MX board named is a \$999 24-bit board.

EasyShare Mac Menu is available from Learning Performance Corporation at 800/926-3279. (New Products, August 1992). Prices range from \$99.95 to \$4995 for 1 to 100 users.

continues

Project Scheduler 5™

Award-winning
Project Scheduler 4 just got better.



Introducing the next generation in the award-winning Project Scheduler series—Project Scheduler 5 for the Macintosh.

Awarded "Editor's Choice" by MACWORLD in April 1992, Project Scheduler 4 has gained greater functionality and enhanced performance in Project Scheduler 5. With Project Scheduler 5, you can meet the challenges of coordinating multiple projects. Now, managing tight schedules, limited resources, and different computing platforms is easier than you ever thought possible.

Effective communication.

As a project manager, you know that communication is your most important—and most difficult—task. With Project Scheduler 5, you can convey your scheduling information effectively through customized reports and schedules. And, since Project Scheduler 5 is available in Macintosh, DOS, and OS/2 versions, you can track projects and update schedules easily, even in a multi-platform environment.

Multi-project management with ease. With Project Scheduler 5 you can track resources and status across multiple projects. Integrate multiple projects into groups and establish dependencies that cross project

boundaries. Automatically calculate validated group schedules using error-free, cross-project critical path analysis. And automatically update individual projects to accommodate schedule commitments and changes made at the group level.

A professional product. Backed by professional support.

When you have a question, we'll get you the answer fast—without making you waste your time waiting in an electronic queue. Our support program even provides direct access to Project Scheduler 5's designers. And we offer the most comprehensive training and consulting program in the industry.

The ideal corporate solution.

Whether you're managing multiple projects in a Fortune 500 corporation, or a single project in a small business, Project Scheduler 5 is the fast, easy, and elegant way to make everything come together—on time, every time.

For more information, call or write:

415/570-7700

393 Vintage Park Drive
Suite 140
Foster City, CA 94404

 **Scitor**
Corporation

LEVY MIGHT WANT TO SEND A SIGNAL to the wretchedly excessive software hogs by using WriteNow 3.0. It is a fraction of the price of Word 5.0; it's fast, even on a Mac Plus; and it runs in a default memory allocation of 490K. No, I do not work at T/Maker, nor am I in any way associated with them. But I do believe if you don't like the software you are using, vote with your feet and support the developers who are doing the things you like.

Robert Stevenson
Sunnyvale, California

Those Reviewed Talk Back

IN THE ARTICLE "RENDERING: MAKING Realistic 3-D Graphics" (June 1992), David Poole does not include Infini-D in the list of products that excel at lighting, yet Infini-D offers the same features that he credits the other programs for—visual feedback and flexible control of parameters.

Poole also says that ElectricImage Animation System 1.03 has advanced capabilities for creating compound surfaces. However, ElectricImage allows you to use only two texture maps to create a compound surface, while Infini-D supports an unlimited number of texture

maps and mapping methods.

Poole states that "you may end up buying Infini-D for its effects, and another product for its overall quality." I would agree with anyone who says that Infini-D's antialiasing quality may not be quite what they need for broadcast video. However, I strongly disagree that Infini-D is not good enough for print work.

Finally, there seems to be a bias against midrange products under \$1000. Yet, the output from Infini-D and StrataVision 3D has easily held its own against expensive products. ElectricImage is fast, but how many readers can afford a \$7500 product?

Andrei Herasimchuk
Marketing Director, Specular International
Amherst, Massachusetts

We erred in not including Infini-D in the list of programs that excel at lighting, and we incorrectly stated that you can't create procedural textures with Phong shading. We were unclear about the use of compound surfaces in ElectricImage—the use of the alpha channel with textures gives ElectricImage advanced capabilities. Similarly, we were unclear in comparing ElectricImage's bump map abilities to those of Infini-D—Infini-D allows an unlimited number of bump maps; ElectricImage allows only two. But our reviewer felt that ElectricImage produces more pronounced, higher-quality bump maps.—Ed.

THANK YOU FOR YOUR RECENT REVIEW of Workspace (*Reviews*, July 1992). I believe that the negative aspects of your review arise from a misunderstanding of the program rather than from any design or programming defects.

In contrast to your assertions, Workspace indeed recognizes more than 23 applications. Workspace automatically loads 23 applications into the binders as a courtesy to the new user. All other applications are listed in the Binder Setup dialog box, ready for the user to move into binders at the click of a button.

Also in contrast to your review, the Workspace user need not navigate through layers of folders or wish for a Find function to assist the process. Everything needed for productive work—both applications and documents—is immediately available to the user from within Workspace.

Steven Paul Snyder
Workspace Product Manager, Ark Interface
Seattle, Washington

While it is true that loading applications into Workspace is not as difficult as my review made it seem, the lack of a fluid Find function is a significant shortcoming when it comes to adding existing documents to projects. And clicking on tools to launch applications

continues

Turn your Mac Into a Professional Trading Station!

Professional Analyst, from Trendsetter Software, let's you analyze real-time market data from Signal instantly.

Designed for the Mac, **Professional Analyst** lets you:

- **Monitor your choice of 500 symbols**
- **Create a wide variety of charts, including Japanese Candlesticks.**
- **Instantly access the best technical studies** including Gann, Fibonacci and computer generated trend lines (a Trendsetter exclusive).
- **Display studies in the same window** as your chart with up to 14 studies per chart and 9 charts per screen.
- **Update charts** each time a trade occurs
- **Get audio/visual alarms** when your Buy/Sell points are reached.



Custom layouts "remember" every aspect of your personal design.

Call Today!

1-800-825-1852 Ext. 27

Trendsetter Software • 2020 N. Broadway, Ste. 102 • Santa Ana, CA 92706 • 714/547-5063 Fax

Signal

Trendsetter

THE WORLD'S FIRST OPTICAL HARD DRIVE.

When will optical drives be as fast as hard drives? At Pinnacle, and only Pinnacle, we proudly answer... today! Introducing the PMO-650™, a high speed 650 MB rewritable optical drive featuring Pinnacle's own OHD™



(Optical Hard Drive)



OHD-650 mechanism by Pinnacle Micro

mechanism. The PMO-650 works like a hard drive, feels like a hard

drive, but it's better - it's optical.

And with optical there are many advantages: removability, reliability, infinite capacity and a low cost per megabyte of disk storage.

Pinnacle's R&D center, located in Colorado Springs, CO, is one of the most advanced optical research and development facilities in the country. The Pinnacle R&D Center is now the leader in optical drive performance and innovation.

The PMO-650 is faster than a Seagate® ST4350N magnetic hard drive and five times faster than Sony's® SMO-E501 optical drive. With speeds faster than most hard drives, the PMO-650's applications are endless. It can replace existing hard drives for general data storage or can be used for vertical applications such as digital audio, digital video or multimedia. The PMO-650 is the ultimate storage system. It's more than a hard drive. It's optical.

XXBENCH TEST XCOPY.EXE DISK TRANSFER

Drive Tested	5 Mb transfer	10 Mb transfer	50 Mb transfer	100 Mb transfer
Pinnacle PMO-650™	38.44	74.28	457.77	921.28
Sony SMO-E501	185.04	396.31	2941.88	4995.14
Seagate ST4350N 350MB	61.26	125.06	819.79	1520.14



PMO-650 FEATURES

- ♦ 3600 RPM rotation speed
- ♦ 19 msec effective access time*
- ♦ MTBF: 30,000 hours
- ♦ Ultra light optic head
- ♦ Split Optic Design
- ♦ ISO/ANSI Standard compliant
- ♦ Direct seek technology
- ♦ Data queuing on reads/writes
- ♦ 20 MHz processor/design
- ♦ Horizontal and vertical mounting
- ♦ Dust-resistant design
- ♦ Plug-and-play ready for MAC, IBM AT/XT, PS/2 and Compatibles, SUN, HP, Silicon Graphics and others

☎ (800) 553-7070

PINNACLE MICRO

19 Technology • Irvine, CA 92718 • U.S.A. • Int'l (714) 727-3300 • Fax (714) 727-1913

Circle 115 on reader service card

THE OPTICAL STORAGE COMPANY®

Trademarks and Registered Marks to their respective owners. • XXBench test performed by XXCAL, Inc. 3/92 • *Test Results performed with a 1/3 stroke plus latency over a 50 MB band width. A 1/3 stroke plus latency is the standard of measurement in the optical storage industry.

tions adds little to what is already achievable in the Finder using System 7 aliases or other utilities. Although I found the interface appealing, Workspace simply didn't add enough functionality to warrant a higher rating.—Franklin N. Tessler

THE REVIEWER'S TESTING OF VersionMaster 1.0.7 (*Reviews*, May 1992) on a stand-alone Mac demonstrated a lack of understanding of the purpose of the product. VersionMaster is a groupware product designed primarily to track document-version control in a Mac workgroup. The reviewer seems only to have considered the product for his own needs.

Jerry Shields
President, Astar Technologies
Littleton, Massachusetts

The reviewer tested the software on a stand-alone Macintosh in addition to tracking different versions of a document on the *Macworld* network.—Ed.

OCR Disparities

WHAT A DIFFERENCE A MONTH makes! In your June 1992 issue you gave a glowing review of WordScan and WordScan Plus (*Reviews*). The reviewer concluded, "If Calera were to knock \$300 off the list price of WordScan Plus,

I would easily recommend it over any other OCR product costing less than \$1000." Calera must have read the review, because they proceeded to significantly reduce the price of both products. I purchased WordScan.

Imagine my surprise at what a dog this product became in just one month. That's when, in your July issue, Macworld Lab tested all the major OCR players ("From Page to Pixel"). WordScan wasn't at the top, it was barely in the middle. The program was considered awkward and confusing to use.

I understand that different people have different opinions—Siskel and Ebert disagree. However, you should then present your reviews and Macworld Lab exposés as just one person's opinion. At the very least be consistent. A product can't be the best in the market and mediocre at the same time.

David Weisbord
Gresham, Oregon

Macworld believes the feature is an accurate evaluation of the OCR packages that were shipping at the time it was written. The review, written a few months earlier, based its comparative evaluation on WordScan 1.0 versus earlier versions of both AccuText and OmniPage. OmniPage Professional, the Editors' Choice overall in the feature, wasn't

shipping when the WordScan review was written.

The review gave the product three stars, which means that there was room for improvement, which is essentially what the author of the feature thought as well.—Ed.

Fearing Obsolescence

I WAS AN INCH AWAY FROM BUYING a Quadra 700 when I read your article introducing the Quadra 950 ("The Quadra 950," July 1992). According to the article, the 950 is faster because of recent technological advances in the making of certain chips, including the Motorola 68040. I also noticed that the price of the Quadra 700 dropped considerably in the past month. Since the 700 contains basically the same components as the 900, does this mean we should expect the Quadra 750 to be released soon? I would hate to be put in the same situation as the owners of the now obsolete Quadra 900.

Bryan Taylor
Dallas, Texas

The continuing advancement of technology guarantees that almost any computer you buy now will be worth less and have a more powerful and less expensive counterpart a year from now. However, as owners of the Mac Plus, Mac II, and other older

**PS17, PS35 and Turbo models
now priced lower!**



No matter which Macintosh® computer you have, there are strong reasons why there's a perfect microLaser printer to go with it. Personal or shared.

1. It's affordable.

For the value-conscious, take a 9 pages-per-minute laser printer, load it up with 17 scalable outline fonts from the Adobe® PostScript® software library, give it an



operating cost of 1.9* cents per page and price it at \$1,449**. Now you've got the best value in the business, for yourself or your business. It's the microLaser PS17.

2. It's upgradeable.

Now take the microLaser we just talked about, double the fonts, have the options of Turbo upgrades for fast graphics, price it at \$1,549** and you've got the microLaser PS35.

3. It's powerful.

For high-speed PostScript printing with a built-in RISC processor, PostScript Level 2, 35 fonts, and automatic switching between PostScript and HP LaserJet® emulation, try a high-performance microLaser Turbo. Perfect for the power user at \$1,799**.

4. It's shareable.

And if you're into networking, the 16 ppm microLaser XL Turbo flies through documents



Five reasons to pick a T

machines can attest, a computer is not obsolete until software manufacturers stop producing software for it.—Ed.

Disadvantages of BetterWriters

IT WAS WITH PARTICULAR INTEREST that I read your review of GDT Software's BetterWriters 1.0.1 (*Reviews*, July 1992). Seeking to improve the graphics output from my DeskWriter last January, I ordered this package. I abandoned it soon thereafter. It is true that the GDT driver provided somewhat better rendering of graphics under some circumstances. It uses halftones to render gradient fills, for instance. However, even there the driver cannot render a dual gradient-fill from Canvas 3.0, nor would the gradient fill survive being passed into a word processing document.

The GDT driver had a marked disadvantage rendering text. My reports from Micrograde 2.0.8 in 9-point TrueType Monaco font printed using this driver have the letters in each word bunched up, with double spaces between the words.

Recently, Hewlett-Packard released version 3.1 of its DeskWriter driver. While not perfect, it prints dual gradient-fills and rotated text from any application.

It maps colors onto a gray-scale image. It allows background printing. Furthermore, this driver has a built-in preview. And it is available at no cost.

*Matthew Ware
Greensboro, North Carolina*

FreeHand Accord

IN RESPONSE TO DEKE McCLELLAND's review of Aldus FreeHand 3.1 in the June 1992 issue (*Reviews*): If Aldus FreeHand is so weak, why is the lion's share of the work that is used and featured in the major Macintosh and computer graphics publications executed with it? The answer is in its intuitive approach to creating color graphics optimized for PostScript output. Graphic artists are willing to work with text dialog boxes in exchange for color, style, and layer palettes and direct-from-file color separations. Given the choice, anyone who has tried to work with Deneba Canvas's QuickDraw-PostScript hybrid approach to generating unpredictable output, and who works with timely production in mind, quickly turns to Adobe Illustrator or Aldus FreeHand. Anyone who has battled Illustrator's approach of direct selection/object selection, dithered Pantone color, limited page size,

limited import, and a single layer will choose FreeHand.

McClelland also states, "The fact that FreeHand can now open and edit some of its own EPS files qualifies as a step in the right direction." FreeHand cannot open its own EPS files. It can, through hot links and System 7 devices, open the file that exported the EPS file. EPS is, by design, an uneditable file format that allows an artist to supply a usable, printable, viewable file to clients and that allows programs to import the finished output of other programs.

*B. Ware
Cleburne, Texas*

First, EPS is not uneditable by design. Since its debut in March 1987, 11 months before FreeHand 1.0 shipped, Illustrator has provided a fully editable EPS format. Both FreeHand and Canvas can directly open and edit EPS documents saved in the Illustrator 1.1 format. With EPS Exchange, FreeHand can open and edit EPS documents saved in the Illustrator 88 and 3.0 formats as well.

Second, try this experiment. Check to make sure your FreeHand Filters file is in the same folder as the FreeHand application. Create a new document in FreeHand. Draw something but keep it simple, and whatever you draw, do not add text, since FreeHand cannot interpret an EPS document with text

continues

microLaser™ for your Mac®.



with the high quality you want. Users on AppleTalk® networks find this to be the smart choice for big-time business, or for those who want to move into the big time without a huge budget. Priced at only \$3,749**.

5. It's reliable.


When you buy a printer, you want it to print. And print. And print. That's just what the microLaser does — the first time, every time, for years.

And, of course, with AppleTalk, PostScript and TI's Paper Tray Manager, microLaser is instantly compatible with whichever Mac you've got.

It's incredible. So pick up the phone and call for details and the name of a dealer near you.

1-800-527-3500.

Circle 313 on reader service card

 **TEXAS
INSTRUMENTS**

© 1992 TI 76544

*Based on suggested retail price of consumables and approximate page coverage rating for each consumable at 4% black (toner, developer and OPC)

**Suggested retail price — includes AppleTalk interface. Dealer prices may vary. microLaser is a trademark of Texas Instruments Incorporated. Mac, Macintosh and AppleTalk are registered trademarks of Apple Computer, Inc. Adobe, PostScript and the PostScript logo are registered trademarks of Adobe Systems Incorporated which may be registered in certain jurisdictions. LaserJet is a registered trademark of Hewlett-Packard, Inc.

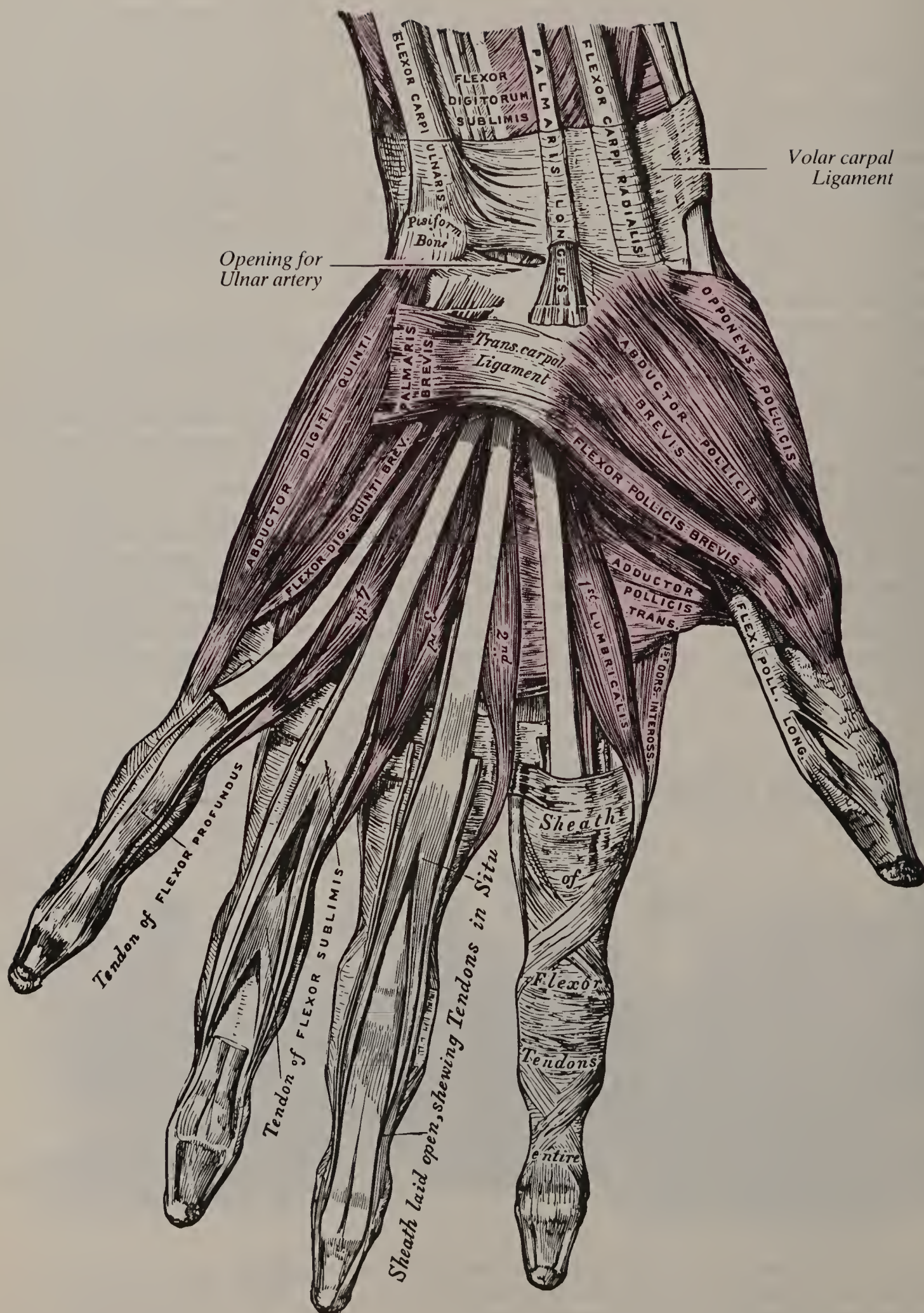


FIG. 482. — The muscles of the left hand. Palmar surface.

THE ARGUMENT FOR THE LESSER MULTANGULAR, LUMBRICALIS AND OPPONENS POLLICIS INTERFACE SET.

In *billion dollar* labora- terrible dragons; it allowed to directly *communicate*
tories around the world, the pilots to fly to the moon; it with computers using, of all
best and the brightest have allows a child to *compose* a things, the hand.
labored for years to build a Valentine to her daddy. It is the *remarkable*
machine with the function- And now, the hand is a Wacom pen. A cordless,
ality of the *human* hand. *natural*, elegant and power- batteryless, pressure-sensitive,
It is as elegant and power- ful computer input device. stylus digitizer.
ful as any of the *marvels* of In another laboratory, the *The way* the hand has
creation. It allowed early best and *the brightest* have worked for centuries, now
mankind to *triumph* over developed a way for all of us works on *a computer*.



WACOM

Putting technology in its place.

in it. Export your document as a Macintosh EPS file. Close the document and do not save changes in the FreeHand file. If you want, quit FreeHand, restart your machine, and clear every possible means of recall to the original path. Then restart FreeHand and open your EPS file directly using the Open command.—Deke McClelland

Mum Mail-Order Company

I AM CURRENTLY INVOLVED IN A DISPUTE with a mail-order house, MacCenter of Austin, Texas, that I found through *Macworld*. The simple story is they not only refuse to repair a Seagate hard drive while it is still under warranty, but they refuse to even discuss the issue or return the hard drive to me. I tried to work through your *Conspicuous Consumer* complaint system, but MacCenter has not responded to your letter. I filed a complaint with the Austin Better Business Bureau, but MacCenter has also refused to respond to them. It has been over four months since I sent the drive to MacCenter, and things appear grim.

Michael Maciag
Orange, California

Since January 1991 we have received 16 complaints about MacCenter; *Macworld* has no record of any

direct responses from MacCenter about the complaints, though Mr. Maciag reports that he did get his drive back after continued effort. For information on how to protect yourself when ordering by mail and specific facts on 38 mail-order companies, see *Conspicuous Consumer*, November 1991.—Ed.

Readers Respond to Readers

IN HER RESPONSE TO ONE OF STEVEN Levy's columns, Julia Lipton Skalka refers to "astrology and other self-help information" (*Letters*, July 1992). Science is information, astrology is fiction. Those who seriously use a horoscope to guide their lives are really in need of help, self- or otherwise.

Kristian Truelson
Orlando, Florida

I AGREE WITH GEORGE FORCE (*Letters*, May 1992) that the McClelland book on Canvas 3.0 is a dud, but that is where Mr. Force and I part company.

Canvas 3.0 does contain a few minor bugs, but what piece of software doesn't these days? And how could unlimited, 800-number tech support be considered lousy? This guy is unbelievable when he says the documentation is sparse: with a 164-page tutorial section and another

680-plus pages of technical details and examples, what does Force want? A 20-minute videotape on each command?

Gary Van Aken
Littleton, Colorado

Looking for an Index

AS A NEW USER, I PARTICULARLY enjoy the equipment and software critiques. I presume there must be some index. I am sure I can find back issues of *Macworld* at our local library. Can you send me such an index, if it exists?

Ronald Nilson
Vancouver, Washington

Indexes for the previous year's issues ran in the January 1985, 1986, 1987, 1988, and 1990 issues and in the February 1989 and 1992 issues. For the 1990 index, send a self-addressed, legal-size envelope with 75 cents postage to 1990 Index, *Macworld*, 501 Second St., San Francisco, CA 94107.—Ed.

Mice or Mouses?

IN YOUR "INPUT ALTERNATIVES" ARTICLE (June 1992), you used the plural of *mouse*, as in a computer mouse, as *mice* continues

INTELLIGENT ACCESSORIES. VERY SMART PRICES.

Whether you're using a PowerBook, networking Classics, or organizing a single workstation, there's a full line of MediaMate accessories to help you get more out of your Mac. More convenience. More performance. More comfort.

MediaMate. Intelligent accessories. Very smart prices. In stores nationwide.



MediaMate

©1992 Hunt Manufacturing Co.

PowerBook, LaserWriter and Mac are registered trademarks of Apple Computer, Inc.

Circle 199 on reader service card

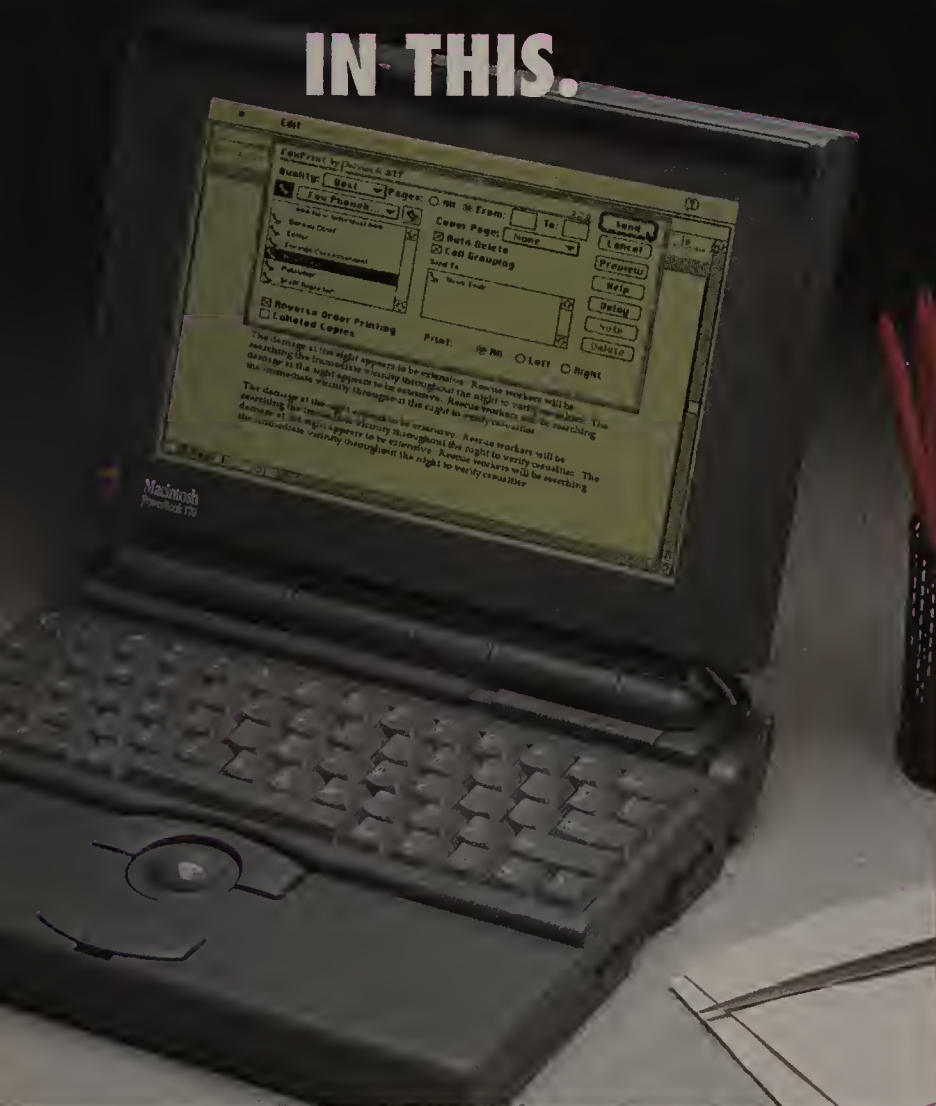
THE FASTEST WAY TO FAX
HOT NEWS FROM HERE.

SO IT'S HOT NEWS HERE.



IN THIS.

IS WITH THIS.



©1992 PSI Integration, Inc. The PSI logo is a trademark of PSI Integration, Inc. All brand and product names are trademarks or registered trademarks of their respective holders.

The new PSI PowerModem™ III is the fastest fax and the only 14,400 bps fax and data modem you can buy for your Macintosh® PowerBook™. For more information, call us at 800.622.1722 or 408.559.8544. **PSI POWERMODEMS. WE GIVE YOU THE WORLD.™**



Circle 61 on reader service card

several times. I had always thought that the plural of *mouse* was *mouses* in the computer word form.

Matthew Haskett
Modesto, California

Webster's Ninth New Collegiate Dictionary (Merriam-Webster, 1986) shows a definition for the computer mouse but does not show any plurals for it other than *mice*. A panel of professional copy editors, when queried, agreed that the plural for a mouse, of any kind, is *mice*.—Ed.

File-Cataloging Shareware

RECENTLY GOT A DISK FROM YOU labeled the "Best of Educorp." There was a program on there called FileTree, which worked for me once, then no more. My letter to the author, Jody Kravitz, was returned by post office with the address unknown.

I am surprised there are not more programs like FileTree. I'll bet there are thousands of disk hoarders out there who could use a program like that. Do you know where I can find a working version of FileTree or any program that will list the contents of my disks?

David Bowen
Canyon City, Colorado

FileTree is available on America Online but has not been updated since 1989, and we have no current address for Jody Kravitz. Another disk-cataloging program, DisKeeper, is available for \$20 from J. Geagan, 7H Laurel Hill Rd., Greenbelt, MD 20770.—Ed.

The Computerized TV

AS A MAC CLASSIC II USER, I AM starting to get a little annoyed with having the small 9-inch black-and-white monitor. I use PageMaker and have problems doing page layouts because of the small size. I was wondering if there is any reasonably priced product on the market that would let me use a TV as a monitor. I would like to use a TV because I have one that I could use, and I can't afford the large monitors that I would like to have.

Mike Hutchinson
Saint Louis, Missouri

You can add a larger computer monitor to your Macintosh Classic II, and several companies have products that allow you to watch television on your computer monitor, but we know of no company that makes a product that allows the use of a television monitor as a Macintosh screen. Moreover, the quality of a television would be too poor for effective work with PageMaker; see "Black-and-

White Monitors," *Macworld*, July 1992, for an overview of low-cost screens.—Ed.

Portable, Not PowerBook

HAVE NOTICED SOME VERY LOW prices for the Macintosh Portable. I was wondering whether you had an old magazine issue with a large article about the Macintosh Portable, similar to your article on the Macintosh PowerBook series that was in the December 1991 issue.

Curt Harris
Lake Bluff, Illinois

We ran a feature article on the Macintosh Portable in our November 1989 issue. For back issues, write to Back Issues of *Macworld*, c/o Snyder Newell, P.O. Box 7046, San Francisco, CA 94120-9727; the cost is \$6 per issue, \$20 overseas.—Ed. m

Letters should be sent to *Letters, Macworld*, 501 Second St., San Francisco, CA 94107, or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld1). Include return address and daytime phone number. Due to the high volume of mail received, we are unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*.

"Second Star to the Right..."



10.5" x 10.5"



8.5" x 11"

Moustrak is embarking upon a mission to boldly go where no one has gone before™. Voyage into the realm of STAR TREK® with the beauty and grace of the original starship or THE NEXT GENERATION ENTERPRISE™. You can find these pads at your local computer dealer, computer superstore or direct from Moustrak. Retail price on both of these pads is \$16.95. Dealers call 800-221-MOUS for a free display sample. Canadian customers call our British Columbia office outside Vancouver at 604-939-3745.

*These are the first of an ongoing series, watch for future releases!
TM, ®, & © Paramount Pictures. All Rights Reserved.

Circle 118 on reader service card

20 lb. copy paper

80 lb. text

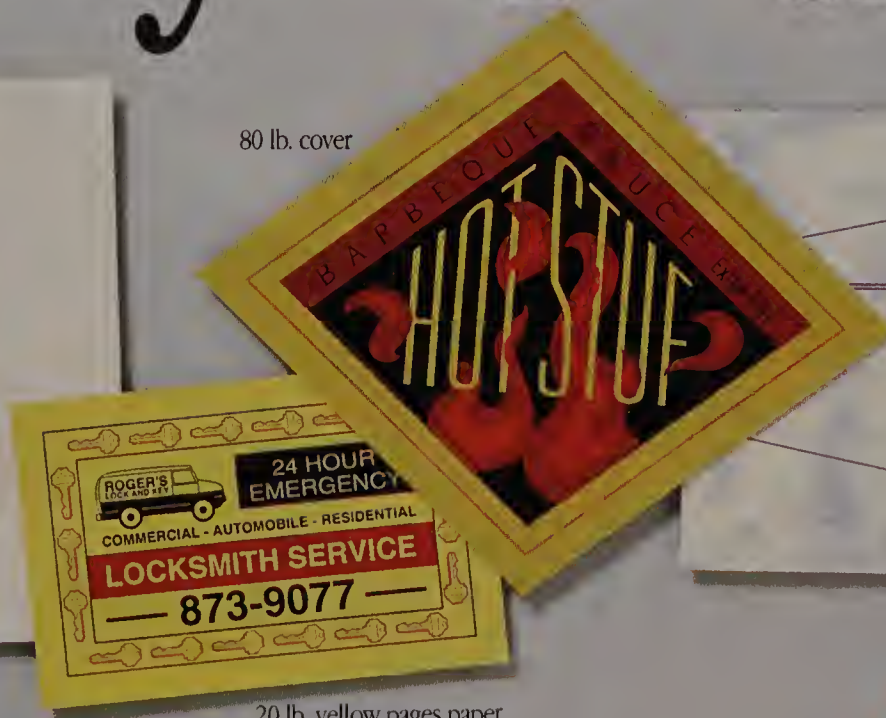
60 lb. marbled paper

60 lb. text

It can take any paper you feed it.



24 lb. bond



20 lb. yellow pages paper



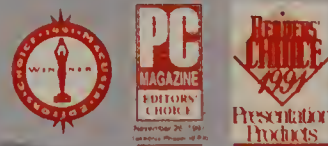
60 lb. marbled vellum

Have you ever wondered what your design would look like printed on a grocery bag? Okay, maybe not. But when you're working with a Phaser™ III color printer, your thoughts do tend to go a little wild.

Because you can feed the Phaser III any kind of paper, from 80 lb. bond to acetate. Even paper towels. It also takes sizes up to 12" x 18" for printing tabloid bleeds. And with 16.7 million colors delivered at 300 dpi, you get gorgeous color on any media.

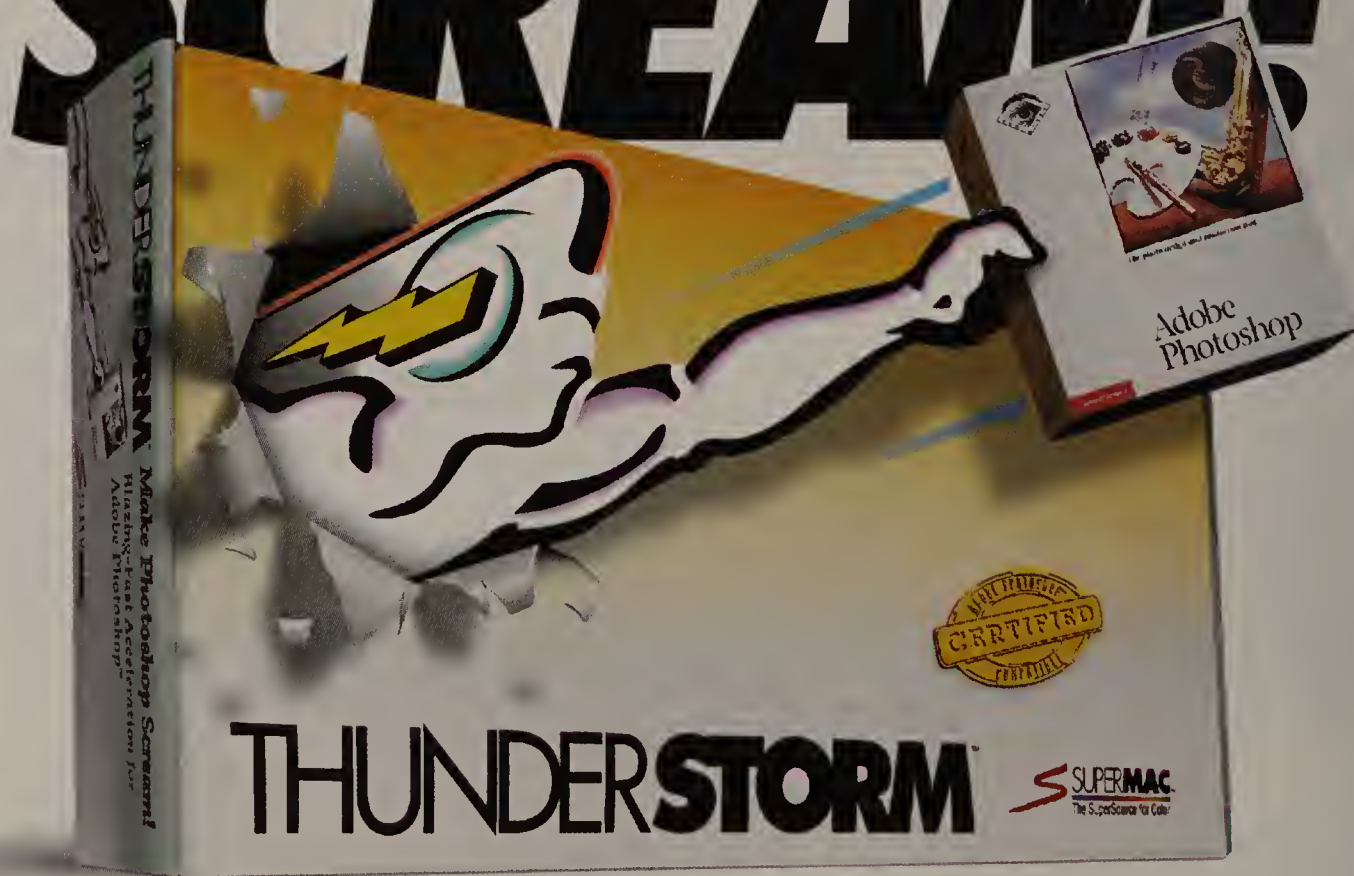
It's driven by a 24 MHz RISC chip with 10 MB RAM. Fast enough for you? And with Adobe's PostScript™ Language Level 2, your message will come out loud and clear.

The only thing you need is a well-fed imagination. Call 1-800-835-6100 Dept. 21C for your free output sample.



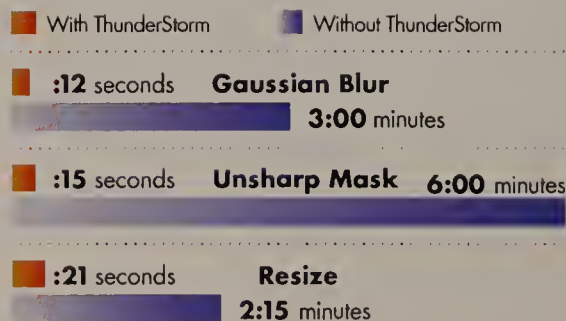
Tektronix

MAKE ADOBE PHOTOSHOP SCREAM!!



Now, for under \$1,000, ThunderStorm™ accelerates the special effects in Adobe Photoshop™ software by as much as 2,300%. You've never seen such speed — and productivity — from Unsharp Mask, Gaussian Blur, Sharpen Edges, JPEG Compression/Decompression, Blur More, Resize, and more.

ThunderStorm, developed in partnership with Storm Technology, lets you take full advantage of Adobe Photoshop's creative potential across a wide range of design, imaging, and retouching projects. And it will provide even *more* functionality in the future.



Performance with 4 MB file on Macintosh IIci

See it in action; it's SuperMac's latest achievement in combining affordability *and* performance in the award-winning Thunder graphics family. For more information or location of the nearest Authorized SuperMac Reseller, call **800-334-3005**. For immediate information via fax, call SuperFacts: 800-541-7680. (In 408 area, call 524-4797.)

SUPERMAC
The SuperSource for Color

© 1992 SuperMac Technology. All rights reserved. SuperMac, SuperMac Technology, Thunder, and ThunderStorm are trademarks and SuperFacts is a service mark of SuperMac Technology. Storm Technology is a registered trademark of Storm Technology. Adobe, Adobe Photoshop, and the Adobe Photoshop logo are trademarks of Adobe Systems, Inc. which may be registered in certain jurisdictions. The Adobe Photoshop front sleeve panel is the copyrighted trade dress of Adobe Systems, Inc., © 1989 Adobe Systems, Inc. All rights reserved.

Circle 88 on reader service card

Art Beat

Behind Macworld's graphics

BY CATHY ABES

Artist: Louis Fishauf is creative director and one of the founding partners of Toronto-based Reactor Art & Design. He has been a Macintosh user since 1987, when he received a Mac Plus as partial payment for an Apple ad he produced.

Hardware: Mac IIx with 32MB of RAM, a 400MB internal hard drive, and a RasterOps ColorBoard 264; 13-inch Apple-Color High-Resolution RGB Monitor; two SyQuest removable-cartridge drives; Wacom graphics tablet; Sharp JX300 color scanner.

Software: Adobe Illustrator 3.2; Adobe Photoshop 2.0.1.

How It Was Done:

For the illustration that opens our feature this month on QuickTime, Fishauf used a combination of scanned photos and created images. The 300-dpi scans include photos of a Greek bas relief, a camcorder, and a box of popcorn, as well as three photos of a horse and rider from the Eadweard Muybridge stop-motion photographic studies done around the turn of the century; the image behind the funnel and the triangle was of a Video-Spigot board, which Fishauf scanned in directly.

In Illustrator he created an initial page with crop marks containing the free-form background, the computer, and the tabletop. He selected the computer and the tabletop, and turned them into guides (using the Make Guide command under the Arrange menu) to hide them. Now only the background was visible in the Illustrator file, which Fishauf then saved. After opening the Illustrator file in Photoshop, in the resulting EPS Input Options dialog

box he changed the default resolution to 200 dpi and set the mode to RGB—an RGB file is three-quarters the size of a CMYK file. In Photoshop, he pasted the free-form background into an alpha channel, where he inverted it to white on black (to mask out everything but the kidney shape). Then he used the Gaussian Blur filter (set at about 10 pixels) to soften the edges.

Fishauf applied four different background textures to the free-form shape to

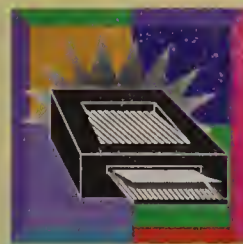
represent the four-step transition from real life to film to video to digital technology. Beginning with a new grayscale Photoshop file, he combined the Add Noise and Emboss filters to create the uppermost, grainy texture. For the second texture, he opened up a black-and-white pattern file and, using the lasso tool, he made a 20-pixel feathered selection and pasted the selection over the first texture. Using the Paste Controls command he set the opacity to 30 percent

to make the grainy texture underneath show through, and chose the Darken Only option to keep the darker areas of the texture visible. Using the lasso tool again, with the same feather setting, he selected the lower portion of the background, where he wanted to place the third texture; he pixelated the second, granular, texture with a Mosaic filter (set to 15 pixels per square) in that selected area. Finally, for the fourth texture, around the lower edge of the free-form shape, he applied the DCI Wind filter (a

continues



The illustration that opens our QuickTime feature on page 170.



BETTER PRINTING SOLUTIONS

POWERPRINT™

Now you can use your Mac® to print to over 1000 non-Apple® printers! Portable printers for PowerBooks™. Wide carriage printers. Inexpensive printers. Or just about any other laser, inkjet, or dot matrix printer you want access to at home, office, hotel business centre or airport lounge.

BETTERWRITERS™

Now you can use your ImageWriter® or StyleWriter® more efficiently! BetterWriters offers built-in spooling, faster and more intelligent printing, and LaserWriter®-like features.

PowerPrint and BetterWriters are compatible with just about anything and has the driver features you want.

- System 7™, TrueType™, Adobe Type Manager™, A/UX®, etc.
- supports color, bins and trays, duplex printing, etc.
- built-in spooling, reduction and enlargement, custom paper sizes, smart forms and label printing, enhanced greyscales, etc.

Both products are also available in network versions for easy sharing of any connected printer over AppleTalk® or EtherTalk® without additional hardware.



GDT Softworks Inc.

4664 Lougheed Highway, Suite #188
Burnaby, BC Canada V5C 6B7

604-291-9121
800-663-6222 (orders)

604-291-9689 (fax)
AppleLink:GDT.MKT

All product names are trademarks or registered trademarks of their respective holders.

MacLabelPro. The Best Just Got Better!

NEW!

Postal Bar Code, Desk
Accessory & Clip Art
from 3G Graphics!

1.



Postal Bar Code...

2.



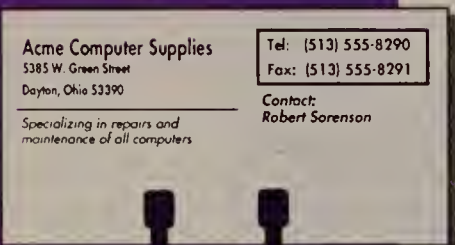
Diskette Labels...

3.



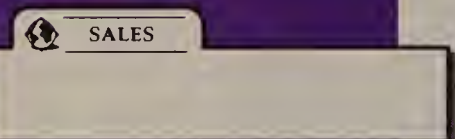
File Folder Labels...

4.



Card Products...
Rotary Cards, Index Cards, Post Cards,
Name Tags with plastic holders.

5.



Custom Tab Dividers...

MACLABELPRO™ Software

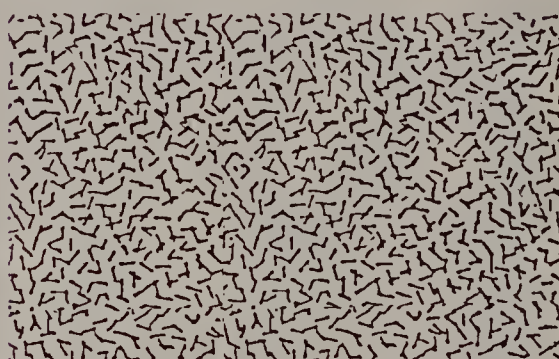
MacLabelPro features include:

- Preset formats for Avery Laser and Dot Matrix Labels
- Easy mail merge
- Sophisticated tool palette (drawing, graphic sizing, text rotation)
- Postal bar code capability
- Desk accessory for quick labels
- Professional clip art from 3G Graphics

Call 1-800-462-8379 for a dealer near you or upgrade information. Retail price only \$99.95



The Illustrator file that contained the shapes of the free-form background, the Macintosh, and the desktop (left). The Illustrator file opened within Photoshop at 200-pixels-per-inch resolution (center). Only the free-form background appears because the other objects were converted to invisible guides in Illustrator. The background shape in the alpha channel (right) after the artist blurred the edge with the Gaussian Blur filter in Photoshop.



The original texture Fishauf scanned in for the free-form background.

third-party filter that's not part of Photoshop) to simulate electronic static.

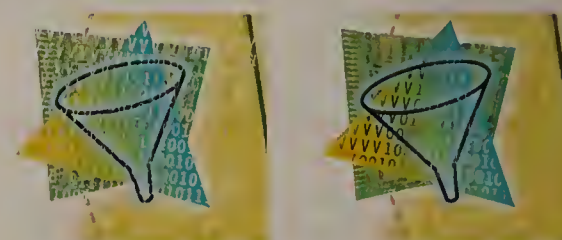
To convert the gray-scale file to RGB color, he used Adjust Hue/Saturation (Image menu). Then he copied the colorized textures and chose Load Selection (under Select menu) to bring the alpha channel into the main (empty) file and define the free-form background area, into which he would paste the textures.

Next, Fishauf went back to his Illustrator file and used the Release All Guides (Arrange menu). The next image he wanted to bring into his Photoshop file was the desktop, so he made everything else a guide and resaved the file. Then in Photoshop he placed the desktop as a floating selection. Because Fishauf had used the Place command, Photoshop used the crop marks from the original Illustrator file to precisely position the desktop shape at the bottom of the textured background. He then opened a wood-grain texture and used Color Balance and Contrast/Brightness to lighten the texture and bring out the grain pattern. After copying and pasting the texture into the floating selection, he again went back to the Illustrator file, released all guides again, selected the two rectangular shapes of the computer, made everything else a guide, and painted the rectangles with a white fill and no stroke, then resaved the Illustrator file. After placing the rectangles in the Photoshop file, he used Paste Controls to set the opacity to 80 percent so the wood

continues



The middle horse-and-rider photo and the black-and-white pattern Fishauf used to create the vertical scan-line effect (top). An alpha channel was created and the selected area was filled with the vertical-line pattern (center). After loading the selection from the alpha channel, he used the Brightness slider to create the scan-line effect (bottom).



The funnel, the triangle, and the type objects created in Illustrator (top left). First the triangle and then the funnel were placed in the Photoshop file over the scanned image of the VideoSpigot board (top right). After coloring the triangle and applying the halo effect to the funnel, he placed the type (bottom left). While the type was still a floating selection, the excess was trimmed away and the type was filled with a black-to-white blend (bottom right).

Circle 160 on reader service card

FREE Software!



Simply mail this card today to MACWORLD and we'll send you—*absolutely FREE*—the new “Best of Educorp” software disk, which includes *Money Matters* for maximizing your personal finances...*Project Leader* for organizing your time, fun games like *Spacestation Pheta*, *Glider*, the popular *Klondike*, and lots more!

YES!

Please send my FREE Educorp Software and enter a one-year (12 issues) subscription to MACWORLD in my name for only \$19.95. That's almost 60% off the annual cover price of \$47.40.

Name _____

Company _____

Address _____

City/State/Zip _____

☐ Please bill me. ☐ Payment enclosed.

Allow 4 to 6 weeks for delivery. Basic subscription price is \$30 for 12 issues. The annual cover price is \$3.95 per issue, \$47.40 annually. For Mexican subscriptions, please add \$18 per year for shipping. For Canadian subscriptions, add \$18 plus \$1.40 (7% GST). Add \$70 annually for all other foreign countries. State and county sales tax will be added where applicable.

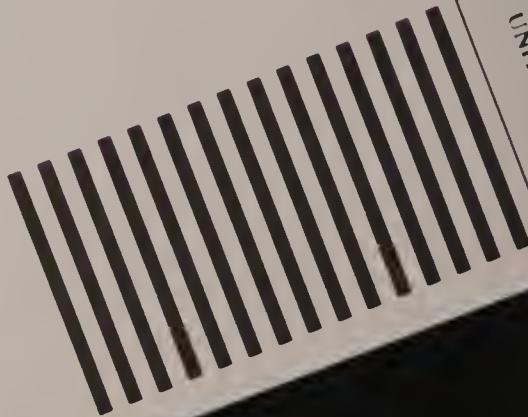
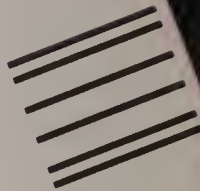
YOURS FREE!

**FREE Software
Subscribe today!**

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 1167 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

**Macworld
Subscription Department
P.O. Box 51666
Boulder, Colorado 80321-1666**

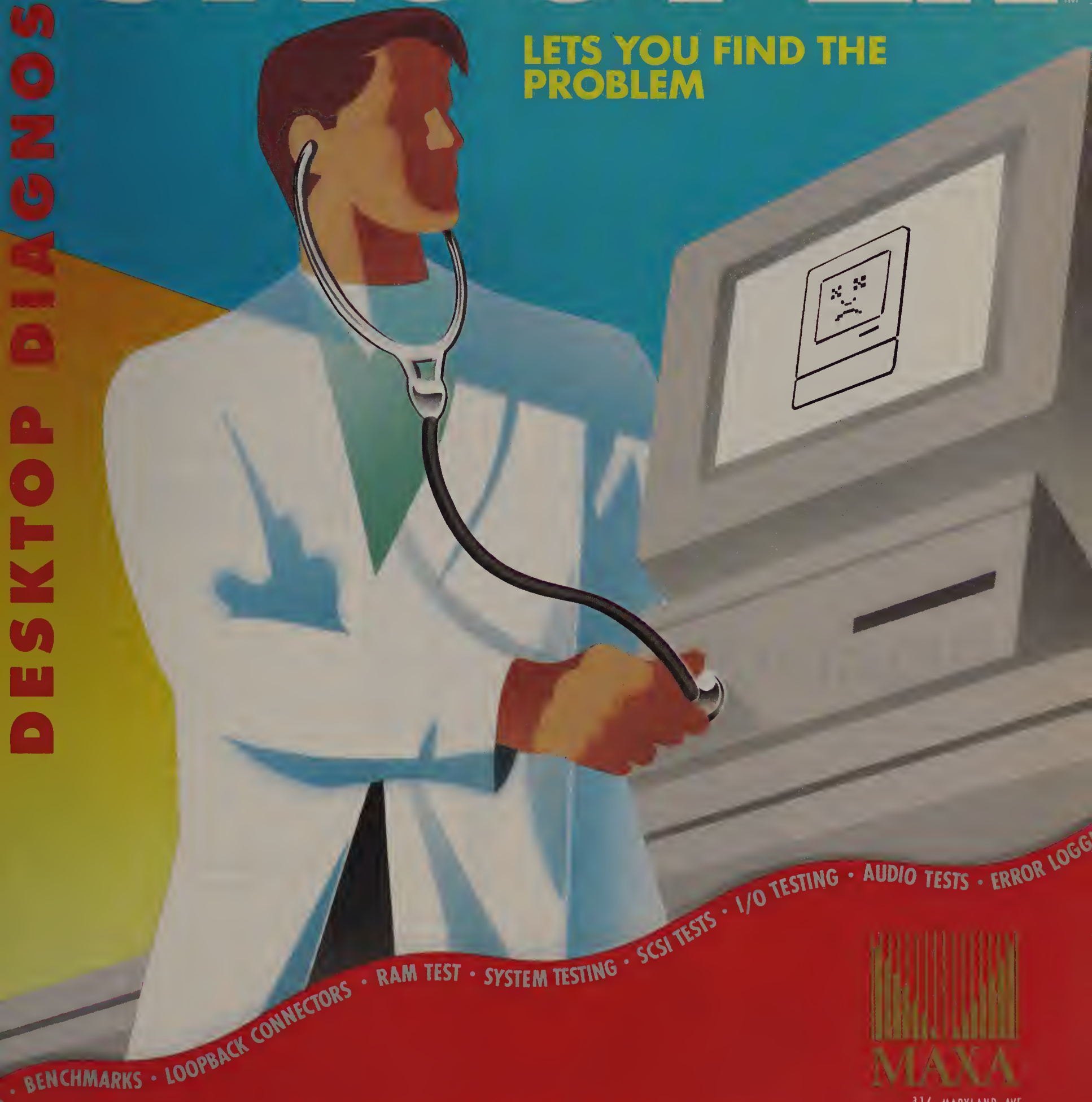


NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

DESKTOP DIAGNOSTICS

SNOOPER™

LETS YOU FIND THE PROBLEM



• BENCHMARKS • LOOPBACK CONNECTORS • RAM TEST • SYSTEM TESTING • SCSI TESTS • I/O TESTING • AUDIO TESTS • ERROR LOGGING

DIAGNOSTIC SOFTWARE FOR MACINTOSH

The next time you see a 'sad Mac' on your screen or your Mac's performance isn't up to par, DIAGNOSE FROM YOUR DESK with SNOOPER, the revolutionary new standard for Mac diagnostic and testing tools.

SNOOPER performs a comprehensive suite of tests,

CHECKS ALL YOUR HARDWARE and identifies any problems. And the same SNOOPER software runs on all Macs.

SNOOPER is easy to use and saves time and money. If you already own Norton Utilities, complete your Mac utilities with SNOOPER, the hardware diagnostic.



116 MARYLAND AVE.
GLENDALE, CA 91206
800-788-6292

MAXA and SNOOPER are trademarks of MAXA Corporation. Other product and company names are trademarks of their respective owners. © 1992 MAXA Corporation. All rights reserved.

Circle 237 on reader service card

grain and some of the background would show through.

The horse-and-rider photos originated as gray-scale scans that he assembled in a Photoshop file. Then he converted the gray-scale file to RGB, using Hue/Saturation to give it a sepia tone. Fishauf used the Blend tool to produce the top-to-bottom color transition between the three photos. In the Blend Tool Options dialog box, he set Mode to Color Only and Color Space to HSB-CCW to blend all the colors in the spectrum between his background color (blue) and his foreground color (red) in a counter-clockwise direction.

To reinforce the theme of transition from natural to digital images, Fishauf treated each of the horse-and-rider photos in a slightly different way. For the top photo, he pasted in a sky blue background with fluffy white clouds at 50 percent opacity. For the middle one, he devised a pattern consisting of one row of white pixels and four rows of black pixels, selected that, and chose Define Pattern (under Edit) to create vertical white lines on a black background. Then he created an alpha channel of that shape, filled it with the pattern, and loaded the selection into the RGB file to select only the white areas of the pattern—every fifth row of pixels; setting the Brightness control to 60 bright-



The scanned image of the Greek bas relief was cropped with the marquee tool (left). After the selection was saved in an alpha channel, the Spatter filter (from Aldus's Gallery Effects) was applied to



give it a rough edge (center). The alpha channel was loaded into the gray-scale file of the Greek bas relief, which was then copied and pasted into the main illustration (right).

ened those white rows to create the vertical scan-line effect. On the bottom picture Fishauf used the Mosaic filter to create a bitmapped look. After pasting the three-photo sequence into the main illustration as a floating selection, he used the Perspective command to squeeze it at the bottom.

Next Fishauf selected and copied a square portion of the scanned VideoSpigot board, then distorted it in Photoshop. After creating the funnel and the triangle in Illustrator, he placed the triangle in Photoshop and filled it with a blue-to-orange blend. Then, once he'd

placed the funnel as a floating selection, he copied it to the Clipboard, feathered the selection by 6 pixels, and made the current background color light blue. Next he deleted the selection, replacing its black edge with a soft blue halo, and pasted the original black-edged funnel over the halo. After placing the type over the funnel, he eliminated the areas outside the triangle using the lasso tool with a feathered edge and the ⌘ key (to subtract from a selection rather than add to it). While the floating type was still selected, he filled it with a black-to-white blend.

To create the rough edge around the Greek head, Fishauf converted the original gray-scale to RGB and gave it a blue tone. After selecting the rectangular area with the marquee and saving it to a new alpha channel, he used the Spatter filter (from Aldus's Gallery Effects) to roughen the edge of the rectangle. He loaded the selection into the gray-scale file. Then he copied and pasted it into the main illustration, where he colorized it and rotated it at an angle. The scissors and clap board were created in Illustrator and pasted in at 70 percent opacity.

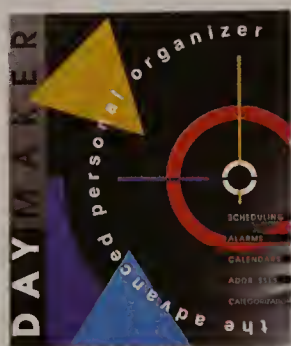
To compensate for the difference between the illustration's screen and printed versions, Fishauf used a home-brewed method of color correction. First he created a file that contained four miniature copies of the illustration (resampled down to 100 dpi). Experimenting with contrast/brightness settings, he saved a different batch of settings for each copy. He had a high-resolution ink-jet color proof made to see which of the settings worked best, then used those settings on the final file. From experience, he's learned that boosting brightness between 15 and 20 percent and contrast between 5 and 10 percent usually gives good results.

The illustration (excluding research and preparation) took roughly 20 hours to create, and the final RGB file size was 10.5MB. **m**

Organize to Succeed

DayMaker™ personal organizer software gives you new power to organize your work and life: Clear, crisp calendars and to-do lists. Helpful graphics time lines (Gantt chart). And a unique "tag" categorization system that lets you define your own information categories and then run and print customized lists and schedules to perfectly match your needs.

DayMaker™ is turnkey software: Create key views and printouts just moments after booting up. And be on your way to an organized life within 60 minutes.



"The premier personal information manager on the Mac." *MacWEEK* System 7 and Quadra compatible. Essential software for the Mac PowerBook™.

\$69.00

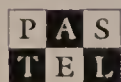


Bonus Gift: For a limited time order DayMaker™ and receive MECA Software's Managing Your Money® FREE. The "Mercedes" of personal finance.—*MacWeek*

Plus \$6.00 shipping (CA, NY and CT residents please add sales tax.)

Full 30-day money-back guarantee.

Call 1-800-756-8553



Requires: A Mac Plus or later with hard drive; 1 Meg RAM; system 6.0.4 or later.

Pastel Development Corporation ▲ 113 Spring Street ▲ New York, NY 10012

Circle 269 on reader service card



AT LAST, AN AFFORDABLE
1200 DPI, 10 BIT SCANNER
THAT CLOSSES THE GAP
BETWEEN DTP AND DTP.

Mac or PC. Design studio,
advertising agency, service
bureau or print shop.

Let's face it : you're not
completely satisfied with the traditional 300 dpi scanner
standard, but you don't want to spend a fortune on higher
quality. That's what we call the gap between DTP and
DTP.

Arcus closes that gap. A superbly designed 10 bit
flatbed CCD scanner with a 1200 dpi resolution, a fast
one pass and over 1 billion colors. Plus software, a fully
integrated transparency module and of course the Agfa
service.

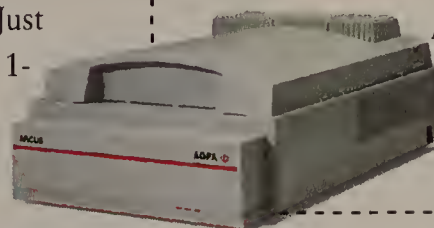
Let your Agfa representative or dealer show you how. Just
call 1-800-685-4271 to arrange a visit (In Canada, call 1-
800-387-9533) or send us the attached coupon.

Arcus. The ultimate quality standard in affordable
color and black/white scanning. Now.

- ☐ Please send me further information on Arcus.
☐ Please arrange for a representative to contact me.

Name.....
Company.....Position.....
Address.....
.....Tel. No.

Please mail or fax this coupon to



Agfa Division of Miles Inc.
200 Ballardvale Street
MS 200-4-7D
Wilmington MA 01887
1-800-685-4271
Fax: 1-508-658-4193

AGFA 

The complete picture

Circle 83 on reader service card

TUNE-IN TO
MacTV™

LEARN ABOUT MAC PRODUCTS

THE EASY WAY

How far will we go to get you the info you need to make buying decisions? Oh, about 40,000 miles. Direct from our TV studio to a broadcast satellite and back to your dish.

It's MacTV™! Another MacConnection customer-service first. An hour-long show filled with product demonstrations, news, and tips for getting the most from your Mac.

With regular appearances by *MacWEEK* columnist Don Crabb, MacTV is for everyone from the individual user to the corporate MIS specialist. Watch as we put all sorts of Mac products through their paces—spreadsheets, databases, hard drives, monitors, utilities, games, and more. There's no better way to learn about Mac software and hardware.

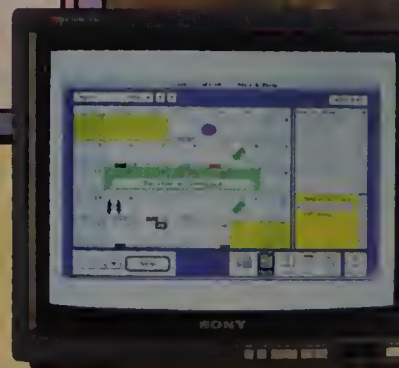


DISH US UP

A NEW SHOW EVERY DAY.

If you or your company has been considering buying a satellite dish, now is a great time because prices for a complete system including installation are as low as \$1000. That's a pretty good deal for a whole new world of TV viewing. Including MacTV, which we uplink every weekday from 8 a.m. to 9 a.m. directly from our studios.

Galaxy 6 Channel 22



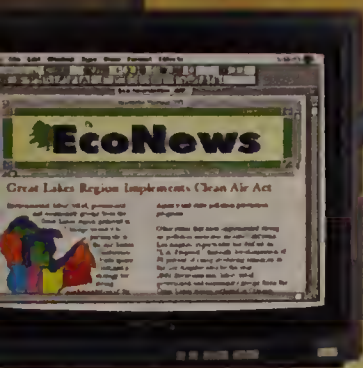
FOR A PROGRAM SCHEDULE
CALL 1-800-800-6912



See us on Mind Extension University/
The Education Network. Check local listings
for air times, or call 1-800-800-6912.

NO DISH?

Soon
you'll be able to order
hour-long videocassettes of indi-
vidual MacTV shows that include
demos of specific products or coverage
of specific topics (e.g., networking,
spreadsheets, etc.). Stay tuned for
details. Or order the
premiere show now
for just \$9.95.



ORDER THE PREMIERE SHOW
\$9.95

Available on VHS

See what Mac

1991 & 1992 Macworld World Class Award Nominee for Best Customer Support-Software. Since 1984, the original Mac mail-order source.

We have over 3,500 items to choose from, and we carry only the very **latest versions** of each product. For products or versions not yet released at press time we've indicated the expected availability dates as supplied to us by the manufacturers. Also, all software is not copy-protected, unless indicated otherwise by (CP).

Products preceded by ⑦ are **System 7** compatible. For *specific features* of System 7, please ask your salesperson when placing your order. Also, our **System 7 Video** featuring *Macworld* Contributing Editor Lon Poole is just \$9 (2244) or *free* when you order Apple's System 7 for \$79 (1074).

Companies participating in the 30- or 60-day **Money Back Guarantee** program are highlighted with a ★. If you are not satisfied with your purchase of any MBG item, call us for an authorization and return it *with all of the original packaging/reg. card* within the guarantee period for a refund check (or credit on your credit card.) We reserve the right to limit quantities on returns.

Corporate Accounts welcome. Bids and P.O.'s accepted. Please call 800-800-3333 for information.

POWERBOOK MEMORY, DRIVES, CASES

Computer Care

- 4153 BookView Imperial 140-170 \$1075.
4150 BookRAM 2S 189. 4161 BookRAM 6S 675.

★Dayna ... 60 day MBG

- 5396 DaynaPORT SCSI Link PB (BNC)..... 299.
5360 DaynaPORT SCSI Link PB (10-BASE-T) 299.
5484 DaynaPORT SCSI Link-3 PB..... 349.

Envisio

- 1848 Notebook Display Adapter 030 (0 MB). 629.
1837 (2 MB) 749. 1835 (4 MB)..... 1049.
7098 Notebook Display Adapter 030 (6 MB) 1329.

★FWB, Inc. ... 30 day MBG

- 5567 HammerPB 80.. 789. 5568 PB 120.. 899.

★I/O Design ... 30 day MBG

- 3362 PowerBook SL (Slimline PowerBook Case) 64.
3371 PowerBook EX (External Drive Case)... 69.

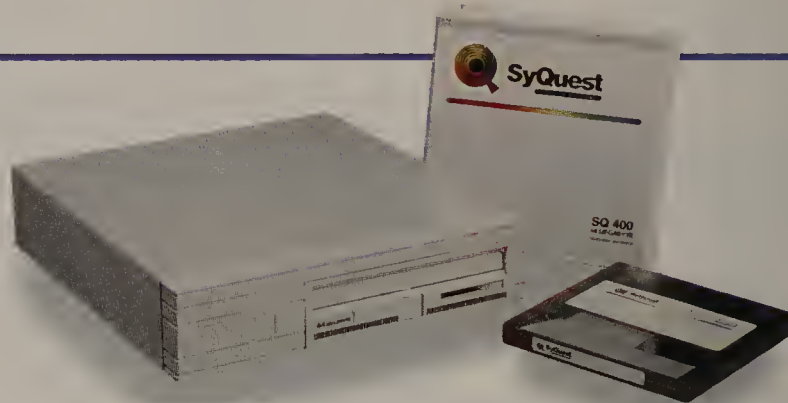
★Kensington ... 30 day MBG

- 1118 Compact PowerBook Case 49.
1092 Deluxe PowerBook Case 79.
5976 NoteBook Keypad 99.



★Kensington ... 30 day MBG

5976 *NoteBook Keypad*—An external numeric keypad for PowerBook computers with a calculator-style layout, mathematical function keys, arrow keys, and the 15 function keys not found on the PowerBook keyboard..... **\$99.**



★MDS Drives ... 60 day MBG

MDS Removable SyQuest Drives—Come complete with one cartridge and all the software you need for low-level formatting of cartridges, selecting interleaves for fastest data access, defining partitions, and initializing them in either Mac or A/UX formats. There's also disk caching and volume password protection.

Plus, get a *free* Salient's *AutoDoubler* or Symantec's *Norton Utilities* with each drive purchased. Backed by a 2 year warranty.

- 5533 MDS 44 with *AutoDoubler* **\$479.**
5532 MDS 44 with *Norton Utilities* **479.**
5534 MDS 88 with *AutoDoubler* **589.**
5535 MDS 88 with *Norton Utilities* **589.**
44 MB & 88 MB SyQuest Cartridges ... *see listing*

MASS Microsystems

- 6304 HitchHiker Portable Granite Case (80 MB) 749.
6306 1" Portable Drive Granite Case (80 MB) 499.
6313 1" Portable Drive Granite Case (120 MB) 599.
3655 MASSfm 24/96 (portable modem)..... 185.

NEC

- 6577 CDR37 Portable CD-ROM Drive 399.

PowerBook Memory Modules

- 3742 PowerBook Module 2 MB..... 119.
5090 4 MB..... 229. 5091 6 MB..... 319.

★PSI Integration, Inc. ... 30 day MBG

- 5320 ⑦PowerModem.. 206. 6961 ⑦10/42.. 295.

★Sophisticated Circuits ... 30 day MBG

- 7425 PowerPad (Aug.) 79. 7419 w/QuickKeys 119.

Sigma Designs

- 6939 Power Portrait (Granite Case)..... 849.

★Targus ... 60 day MBG

- 1305 Universal Notebook 69.
6037 Premier Leather Case 169.

★T/Maker ... 30 day MBG

- 5316 The PowerBundle Carry Case (only)..... 75.

COMPUTERS

Outbound Systems, Inc.

Includes a limited time bundle. \$400 value.

⑦2030E Series (25 MHz 68ec030)

- 2147 442: 4 MB, 40 MB HD (incl. math copro.) 2899.
2109 462: 4 MB, 60 MB HD (incl. math copro.) 2999.
2659 862: 8 MB, 60 MB HD (incl. math copro.) 3249.
2653 882: 8 MB, 80 MB HD (incl. math copro.) 3499.
8503 8122: 8 MB, 120 MB HD (incl. math co.) 3899.
8415 16122: 16 MB, 120 MB HD (incl. math co.) 4149.

⑦2030S Series (33 MHz 68030)

- 2107 442: 4 MB, 40 MB HD (incl. math copro.) 3379.
2105 462: 4 MB, 60 MB HD (incl. math copro.) 3579.
2684 862: 8 MB, 60 MB HD (incl. math copro.) 3839.
2669 882: 8 MB, 80 MB HD (incl. math copro.) 4079.
8414 4122: 4 MB, 120 MB HD (incl. math co.) 4249.
8416 8122: 8 MB, 120 MB HD (incl. math co.) 4499.
8413 16122: 8 MB, 120 MB HD (incl. math co.) 4749.
7938 PocketPort Fax/Modem..... 299.

DAILY BUSINESS ACCOUNTING, DATABASES, SPREADSHEETS, WORD PROCESSING

A Lasting Impression

- ⑦ResumExpert or Cover Letters ea. 48.

Abacus Concepts

- 7106 ⑦StatView 4.0 369.

★Aclus ... 30 day MBG

- 5618 ⑦4th Dimension 2.2.3..... 509.

Amaze, Inc.

- 4989 ⑦CATHY Daily Planner..... *special* 34.
3582 ⑦The Far Side Computer Calendar 39.

★Attain Corporation ... 60 day MBG

- 8465 ⑦In Control 1.1 87.

★Avery ... 60 day MBG

- 7446 ⑦MacLabel Pro 1.5 48.

★Banner Blue ... 30 day MBG

- 3548 ⑦Org Plus Advanced 1.0..... 125.

★Baseline Publishing ... 30 day MBG

- 8881 ⑦Thunder 7 1.0.6 55.

★Beagle Bros. ... 30 day MBG

- 3119 ⑦BeagleWorks.. 179. 3563 Upgrade .. 89.

★Chena Software ... 30 day MBG

- 1594 ⑦Fair Witness 1.2..... 185.

★Claris ... 30 day MBG

- 1129 ⑦MacWrite II 1.1V2..... 89.
3903 ⑦ClarisWorks 1.0V2 199. 3743 ⑦Upgrade 95.
3531 ⑦Claris Resolve 125. 3745 ⑦Upgrade 95.
8216 ⑦FileMaker Pro 2.0 268. 4752 ⑦Upgrd. 99.
1125 ⑦MacProject II 2.5V1 345.

★Essential Software ... 30 day MBG

- 4086 ⑦Easy Alarms 2.0 61.

★Expert Software ... 30 day MBG

- 5234 ⑦Expert Writer 1.0..... 29.

★ExperVision ... 30 day MBG

- 7486 ⑦TypeReader 1.0 (Intelligent OCR).... 509.

Helix Technologies

- 5796 ⑦Double Helix 3.5.9 299.



★Attain Corporation ... 60 day MBG

8465 ⑦*In Control 1.1*—Get organized fast with the top-rated To-Do-List Manager. Rate 4½ Mice by *MacUser* (8/92). In Control's multi-column outline lets you organize and reorganize your lists instantly **\$87.**

products can do.



★**Lotus Development ... 30 day MBG**
 3606 ⑦*Lotus 1-2-3 for Mac*—Takes full advantage of the Mac. Directly manipulate and format all data, text, and graphics. Offers true 3D worksheets & Excel & 1-2-3 file compatibility **\$329**.
 3604 ⑦*1-2-3 Competitive Upgrade* 99.

- ★**Intuit ... 30 day MBG**
 2507 ⑦*Quicken 3.0* 42.
 ★**Kaetron Software ... 30 day MBG**
 8941 ⑦*TopDown 3.1* 199. 6317 Upgrade 129.
 ★**Lotus Development ... 30 day MBG**
 3606 ⑦*1-2-3 for Mac..* 329. 3604 Upgrade . 99.
 ★**MECA ... 60 day MBG**
 2796 ⑦*Managing Your Money 5.0* 49.
 ★**Microlytics ... 60 day MBG**
 6461 ⑦*WordFinder Plus 4.02*..... 39.
 7820 ⑦*Random House Encyclopedia 1.0* 68.
 ★**Microsoft ... 30 day MBG**
 2884 ⑦*Works 3.0 (Aug.)* 155. 8173 ⑦*Upgrd.* 79.
 3669 ⑦*Excel 4.0...* 295. 5237 ⑦*Upgrade..* 125.
 4902 ⑦*Word 5.0...* 295. 1503 ⑦*Upgrade..* 125.
 5454 ⑦*The Microsoft Office 2.5* 475.
 ★**Niles & Associates ... 30 day MBG**
 4602 ⑦*EndNote 1.5*..... 85.
 8010 ⑦*EndNote Plus 1.2*..... 145.
 Nisus Software
 5683 ⑦*Nisus 3.06* 238. 1612 ⑦*Compact 3.3* 92.



★**Aldus ... 30 day MBG**
 7541 ⑦*IntelliDraw*—Extraordinary new drawing program with intelligent features that give you a new easy way to draw, refine, and visually experiment with your ideas. “Intelligent” clip art, innovative “visual what-if” and more **\$199**.

- ★**Nolo Press ... 30 day MBG**
 2981 ⑦*WillMaker 4.0 (not valid in LA.)*..... \$35.
 1204 ⑦*Living Trust 1.0 (not valid in LA.)*..... 45.
 ★**OCCAM Research Corp. ... 60 day MBG**
 3697 ⑦*MUSE 1.01* 469.
 ★**Palo Alto Software ... 60 day MBG**
 6932 ⑦*Employee Handbook Toolkit 5.2*..... 65.
 6975 ⑦*Business Plan Toolkit 4.0* 75.
 ★**Pastel Development ... 30 day MBG**
 1785 ⑦*DayMaker 1.01* 61.
 PC Globe, Inc.
 3608 ⑦*MacUSA...* 35. 3356 ⑦*MacGlobe* ... 46.
 ★**Portfolio Systems ... 30 day MBG**
 7992 ⑦*DynoPage 1.7 or 6916 ⑦Dyindex.* ea. 72.
 ★**PowerUp ... 30 day MBG**
 7696 ⑦*Calendar Creator 1.01* 44.
 ★**ProVUE ... 60 day MBG**
 4582 ⑦*Panorama II 2.0.6* 239.
 ★**Reality Technologies ... 30 day MBG**
 6929 ⑦*WealthBuilder 1.02* 95.
 ★**Reference Software ... 30 day MBG**
 6268 ⑦*Grammatik Mac 2.0* 44.
 Round Lake Publishing
 ⑦*LetterWorks, SALES or LEGAL* ea. 45.
 ★**SoftSync, Inc. ... 30 day MBG**
 7129 ⑦*Accountant, Inc.* 335. 3828 *MultiUser* 569.
 ★**Symantec ... 30 day MBG**
 2237 ⑦*GreatWorks 2.0* 129. 2278 ⑦*Upgrade* 89.
 3422 ⑦*More 3.1* 265.
 ★**Synergy ... 30 day MBG**
 6617 ⑦*KaleidaGraph 2.1.3*..... 150.
 ★**Teleware ... 30 day MBG**
 7616 ⑦*M.Y.O.B. 3.0* 138.
 ★**TIMESLIPS ... 30 day MBG**
 2986 ⑦*Timeslips III 2.1* 194.
 ★**T/Maker ... 30 day MBG**
 1858 ⑦*FaxMania (birthdays to bulletins)* 25.
 3639 ⑦*WriteNow 3.0* 149. 5259 ⑦*Upgrade* 49.
 5253 ⑦*WriteNow 3.0 Competitive Upgrade* ... 69.
 ★**Vertical Solutions ... 60 day MBG**
 5886 ⑦*FastLabel 3.1.6*..... 45.
 ★**WordPerfect ... 60 day MBG**
 3800 ⑦*WordPerfect 2.1* 279. 4711 Upgrade 89.
 ★**Wordstar ... 30 day MBG**
 6984 ⑦*Correct Grammar 3.01*..... 55.
 3554 ⑦*American Heritage Dictionary 1.0*..... 59.
 ★**Working Software ... 60 day MBG**
 5896 ⑦*Last Resort* 38. 3792 ⑦*Spellswell 2.2* 44.

GRAPHICS & DESIGN PUBLISHING, PRESENTATIONS

- ★**Abracadata, Ltd. ... 30 day MBG**
 9990 ⑦*Design Your Own Home - Architecture,*
 9992 *Interiors or 9994 Landscape...* ea. 59.
 Adobe Systems
 ⑦*Adobe Type Sets for Business* ea. 95.
 ⑦*Adobe Type Library (Vol. 1-275)*..... call
 8794 ⑦*Adobe Type On Call (CD-ROM)* 56.
 6957 ⑦*Adobe Type Reunion 1.0.2*..... 41.
 5750 ⑦*Adobe Type Manager 2.0.3* 59.
 6053 ⑦*Plus Pack 2.0* 118. 6098 ⑦*TypeAlign* 61.
 4145 ⑦*Adobe Premiere 2.0 (Sept. '92)*..... 305.
 8171 ⑦*Adobe Illustrator 3.2 (with ATM)*..... 368.
 5001 ⑦*Streamline* 119. 6644 ⑦*Photoshop* 548.
 ★**Aldus ... 30 day MBG**
 6674 ⑦*Aldus Personal Press 2.0* 99.
 2461 ⑦*Aldus Gallery Effects 1.0* 128.
 3506 ⑦*SuperPaint* 129. 3507 ⑦*Super 3D..* 325.
 4751 ⑦*Persuasion* 325. 1330 ⑦*FreeHand.* 394.
 7088 ⑦*PageMaker 494.* 7541 ⑦*IntelliDraw* 199.



★**Claris ... 30 day MBG**
 8216 ⑦*FileMaker Pro 2.0*—Top-rated database manager allows you to manage, present, & share info effortlessly. It puts you in control of your data & increases your productivity **\$268**.
 4752 ⑦*FileMaker Pro Upgrade* 99.

- Altsys
 1983 ⑦*EPS Exchange 2.0* 89.
 1195 ⑦*Fontographer 3.5* 258.
 ★**Ares Software ... 30 day MBG**
 8878 ⑦*FontMonger 1.5 (Aug. '92)*..... 93.
 ★**Baseline Publishing ... 30 day MBG**
 8055 ⑦*Screenshot 1.2* 34.
 ★**Bitstream ... 30 day MBG**
 2251 ⑦*Type Essentials: Headlines* 44.
 ⑦*Type Essentials (all others)* ea. 69.
 Broderbund Software
 3572 ⑦*Kid Pix 1.2..* 34. 7293 ⑦*Companion* 23.
 1427 ⑦*Print Shop*..... 35.
 6281 ⑦*TypeStyler 2.0 (with ATM)*..... 126.
 ★**Claris ... 30 day MBG**
 2518 ⑦*MacDraw Pro* 275. 7505 ⑦*Upgrade* 95.
 8007 ⑦*Claris CAD 2.0*..... 599.
 Custom Applications
 8037 ⑦*Freedom of Press Light 3.03 (17 fonts)*. 84.
 ★**DeltaPoint ... 60 day MBG**
 3558 ⑦*DeltaGraph Professional 2.0 (w/calc.)* 199.



★**DeltaPoint ... 60 day MBG**
 3558 ⑦*DeltaGraph Professional 2.0*—Over 35 different chart types for business, presentation, scientific, statistics, & engineering. From 10/1/92 thru 1/31/93, receive a FREE Texas Instrument advanced scientific calculator (TI-68)... **\$199**.

Tune in to our new



★ALSoft ... 30 day MBG

5204 **ALSoft Power Utilities 1.0.2**—Seven performance enhancing utilities for a faster, safer & smarter Mac. Features DiskExpress II for intelligent disk optimization & MasterJuggler for easy font suitcase & applications mgmt. **\$62.**

★Deneba Software ... 30 day MBG

3227 **Canvas 3.04** 259.

★Expert Software ... 30 day MBG

4870 **Expert Color Paint 1.0** 29.

Fractal Design

5425 **Painter 1.2** 235.

★Letraset ... 30 day MBG

4709 **LetraStudio 139. 6300 FontStudio** 359.

Light Source

3733 **Ofoto 1.1.1** 275.

★Linguist's Software ... 60 day MBG

Over 100 language fonts..... call

★Macromedia ... 30 day MBG

7651 **Action! Mac** 349.

7441 **SwivelPro** 479.

3450 **SwivelMan** 619.

7653 **MacroModel** 999.

★MicroMaps ... 30 day MBG

7556 **MapArt (PICT) or 7555 (EPS)**..... ea. 89.

★Microsoft ... 30 day MBG

2878 **PowerPoint 2.01E** 245.

Postcraft International

2210 **Effects Specialist 1.04** 89.

Quark

7612 **QuarkXPress 3.1** 549.

★Specular International ... 30 day MBG

4962 **Infini-D 2.0** 647.

Terrace Software

9970 **Mum's The Word Plus (gardening)**... 107.



After Hours Software

1352 **TouchBASE 2.0.1**—Keeps track of personal & business contacts **\$79.**

3314 **DateBook 1.0**—Combines calendar, scheduling, alarms, & To-Do lists to help you keep on top of your important events **79.**

★Timeworks ... 30 day MBG

7115 **Publish It! Easy 2.1 w/File-It!** special **\$89.**

7409 **ColorIt! 2.0** special **129.**

★T/Maker ... 30 day MBG

ClickArt (bitmapped) 38. or (EPS) 82.

★Virtus Corporation ... 30 day MBG

4488 **WalkThrough 1.1** 309.

PROGRAMMING UTILITIES, HYPERCARD, SECURITY

★Abbott Systems ... 30 day MBG

2515 **Calc+ 1.0** 39. 5236 **CanOpener 2.0** 59.

After Hours Software

1352 **TouchBASE or 3314 DateBook**... ea. 79.

7411 **TouchBASE & DateBook Bundle**..... 122.

★Aladdin Systems ... 30 day MBG

7410 **StuffIt Space Saver**..... 34.

6740 **StuffIt Deluxe 3.0 (Aug. '92)** 65.

★Aldus ... 30 day MBG

5100 **SuperCard 1.6** 195.

★ALSoft ... 30 day MBG

9808 **MasterJuggler 1.58** 25.

9807 **DiskExpress II 2.11** 48.

5204 **ALSoft Power Utilities 1.0.2** 62.

★Alysis Software ... 30 day MBG

2687 **SuperDisk!** 49. 1608 **More Disk Space** 42.



★Inline Design ... 30 day MBG

7068 **INITPicker 2.02**—Stops INIT conflicts that cause start-up crashes. "Our pick as the front runner," *MacWEEK* (6/90) **\$38.**

2913 **Redux 1.63**—The "better, simpler backup," *MacWEEK* (12/91). For power-users & novices **49.**

Apple Computer

1074 **System 7 Personal (w/free PCTV video)**. 79.

3413 **System 7 Group Upgrade Kit**..... 249.

7072 **QuickTime Starter Kit** 149.

★ASD Software ... 30 day MBG

7085 **FileGuard 2.7 (1 user)** 138.

7422 **(5 user)**... 479. 7423 **(10 user)**... 799.

★Baseline Publishing ... 30 day MBG

7783 **INIT Manager 1.1**..... 33.

3114 **INIT Info Pro 1.0** 39.

★Berkeley Systems ... 30 day MBG

2198 **More After Dark (M.A.D.)**..... 23.

5737 **After Dark 2.0V** 28.

2196 **After Dark & M.A.D. Bundle**..... 39.

★Casa Blanca Works ... 30 day MBG

1593 **Drive 7 2.2** 49.

★CE Software ... 60 day MBG

1727 **CalendarMaker 3.0.1** 31.

8024 **QuickKeys² 2.1.2** 93.

★Central Point ... 30 day MBG

5041 **Mac Tools Deluxe** limited special 89.

★Clarls ... 30 day MBG

8734 **HyperCard Development Kit 2.1** 139.

★Connectix ... 30 day MBG

8441 **CPU 1.0 (Connectix PowerBook Utilities)** 49.

Coral Research

7310 **TimeLog**... 62. 7309 (10 Pack).... 399.



★Aladdin Systems ... 30 day MBG

6740 **StuffIt Deluxe 3.0**—Compression solution solves all your needs from archiving to transparent compression **\$65.**

7410 **StuffIt Space Saver**—Increases disk space without changing the way you work **34.**

★Dantz Development ... 30 day MBG

3393 **DiskFit Pro 1.0** 72.

5255 **Retrospect 147. 7945 Remote 1.3** 264.

7946 **Remote (10 Pak)** 147. 3112 **(50 Pak)** 649.

★ElseWare Corp. ... 30 day MBG

4871 **Checklist 2.02** 62.

1507 **Barcode Kit or 1506 Datashaper** ea. 62.

★Fifth Generation ... 30 day MBG

4287 **PYRO! 4.01** 27. 3955 **Suitcase 2.1** 53.

7704 **Public Utilities (Aug. '92)**..... 98.

8286 **SuperLaserSpool 3.0** 99.

5178 **FastBack Plus or 5725 DiskLock**... 125.

7404 **DiskDoubler 3.7.5** 45.

4838 **AutoDoubler**.. 45. 6092 (10 pak) ... 295.

★FWB, Inc. ... 30 day MBG

7929 **Hard Disk Utilities Personal Edition**.... 49.

2999 **Hard Disk Toolkit 1.1.1** 125.

★ICOM Simulations ... 30 day MBG

6296 **Intermission**.. 29. 3731 **OnCue II**.. 29.

★Inline Design ... 30 day MBG

7068 **INITPicker 2.02**..... 38.

2913 **Redux 1.63 or 2936 HAM** ea. 49.

★Insight Development ... 30 day MBG

6171 **MacPrint 1.3** 92.

★Kent Marsh Ltd. ... 30 day MBG

9513 **FolderBolt 1.02** 71.

1839 **NightWatch II** 89.

★Kiwi Software ... 60 day MBG

6267 **KiwiENVELOPES! 3.1.6** 32.

3518 **KiwiPOWERWINDOWS 1.0** 50.

★Magic Software ... 30 day MBG

7267 **AutoSave II** 26. 7270 **Backmatic** . 50.

★Microcom ... 30 day MBG

4803 **Virex/Mac**.. 57. 8561 **911 Utilities**.. 89.

★MicroMat Computer Sys. ... 30 day MBG

3732 **MacEKG II** 99.

★Nine to Five Software ... 30 day MBG

9767 **Reports 2.5** 125.

★Now Software ... 30 day MBG

1793 **Now Up-To-Date**... 65. 2366 (10) . 395.

6925 **Now Utilities 4.0**... 95. 8471 (10) . 775.

★ON Technology ... 1 year MBG

6385 **On Location 2.0** 75.

Palomar Software

8210 **PLOTTERgeist 2.0** 249.

Peripheral Land, Inc. (PLI)

7326 **Mac-to-DOS** 99.

★Symantec ... 30 day MBG

5176 **Symantec AntiVirus for Mac (SAM)**.... 64.

6748 **Norton Utilities for Mac 2.0** 95.

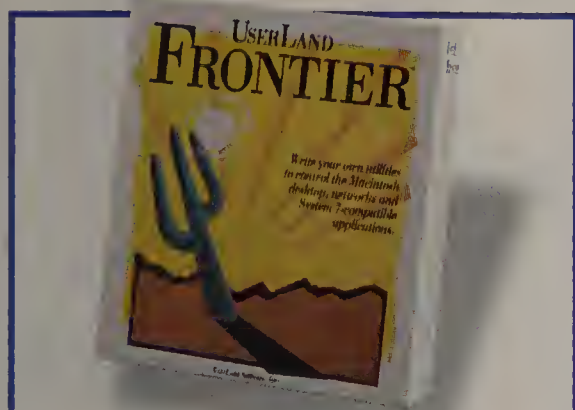
3421 **THINK Pascal 165. 2688 THINK C** 199.

9957 **THINK Reference 1.0** 68.

Teknosys

5203 **HELP!** 88.

daily show: MacTV.™



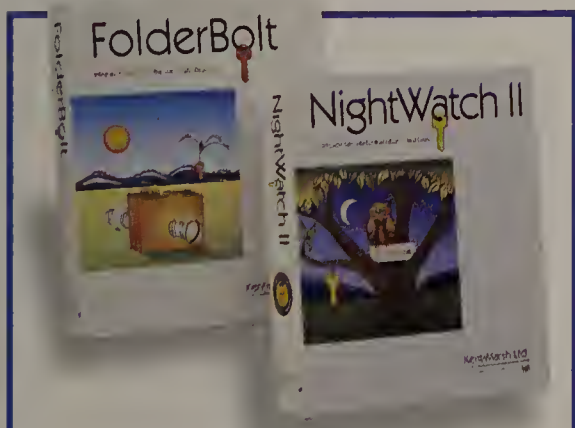
UserLand Software

4753 **Frontier 1.0**—Power-user's scripting system for System 7. Write & run your own utilities to customize the Mac file system, networks & applications. "Mac users have wanted something like this since 1984," (*MacUser* 12/91) **\$189.**

- ★ **TGS Systems ... 60 day MBG**
- 6667 **Prograph 2.5**..... 299.
- ★ **Thought I Could ... 30 day MBG**
- 4843 **Wallpaper 1.0.2** 37.
- UserLand Software**
- 4753 **Frontier 1.0** 189.
- ★ **Visionary Software ... 30 day MBG**
- 3887 **First Things First 2.1.1** 41.

LEARN & PLAY FOREIGN LANGUAGES, TRAINING, GAMES

- ★ **Abracadata, Ltd. ... 30 day MBG**
- 5805 **Sprout! 1.0 (veggie garden planner)**... 45.
- ★ **Baseline Publishing ... 30 day MBG**
- 7785 **Talking Moose 4.0.2** 22.
- Broderbund Software**
- 6516 **The Playroom 2.0 (CP) (color)** 29.
- Carmen Sandiego Series (CP)**..... ea. 29.
- 8285 **Where/World Carmen Sandiego Deluxe** 47.
- 3559 **SimAnt** 35.



★ Kent Marsh Ltd. ... 30 day MBG

The perfect combination of hard disk & folder security. Rigorous protection at its friendliest. Perfect for single users or site licenses.

- 9513 **FolderBolt 1.02** **\$71.**
- 1839 **NightWatch II** **89.**

- 5871 **SimCity Supreme**..... \$35.
- 8266 **SimEarth 1.1** 40.
- ★ **Centron Software ... 30 day MBG**
- 2707 **Puzzle Master**..... 26.
- 8525 **Casino Master**... 39. 8524 (Color).... 45.
- ★ **Cyan ... 30 day MBG**
- 6320 **Manhole 1.6**..... 19.
- ★ **Davidson & Associates ... 30 day MBG**
- 3922 **Talking Spell It Plus** 29.
- 2574 **New MathBlaster Plus** 34.
- 8278 **Alge-Blaster Plus** 34.
- EARTHQUEST**
- 8050 **EARTHQUEST or 3118 Ecology 1.0** 34.
- Electronic Arts**
- 5702 **4D Boxing**.... 32. 1907 **PGA Golf**.. 39.
- ★ **Expert Software ... 30 day MBG**
- 6219 **Expert Astronomer 1.0**..... 29.
- Graphic Simulations**
- 4756 **Hellcats Over the Pacific 1.0.3** 39.
- ★ **Great Wave ... 30 day MBG**
- 6693 **KidsMath 2.0 (Color)** 25.
- 1513 **ReadingMaze (Color)** 35.
- 4334 **NumberMaze** .. 25. 8527 (Color). 35.
- ★ **HyperGlott Software ... 30 day MBG**
(French, German, Italian & Spanish)
- Word Torture** ea. 34. **Tense Tutor** ea. 38.
- Pronunciation Tutor**
(Span., Fren.) ea. 34. (Germ., Chin.) ea. 38.
- ★ **Inline Design ... 30 day MBG**
- 1562 **3 in Three or 1944 Swamp Gas** ea. 31.
- 8809 **Tesseract 31. 3414 Mutant Beach** 39.
- Interplay Productions**
- 1894 **BattleChess (3D animation)**..... 29.
- 1893 **CheckMate (infinite play levels)**..... 31.
- ★ **Learning Company ... 30 day MBG**
- 2670 **Reader Rabbit 3.0 (CP) (ages 4-7)**..... 34.
- 3687 **Super Solvers: Midnight Rescue!** 34.
- 3281 **The Writing Center 1.0** 51.
- ★ **Leister Productions ... 30 day MBG**
- 7126 **Reunion 3.0** 115.
- ★ **MECC ... 30 day MBG**
- 3963 **Oregon Trail 1.0**..... 28.
- Number, Word, or Super Munchers** ea. 28.
- ★ **Microsoft ... 30 day MBG**
- 2868 **Flight Simulator 4.0 (CP)** 42.
- ★ **Multimedia Library ... 30 day MBG**
- 7312 **Educ. Series V. 1-Animated Relativity** 105.
- ★ **Nordic Software ... 30 day MBG**
- 8258 **Turbo Math Facts 2.0** 24.
- 8257 **Preschool Pack - Color 2.0**..... 34.
- 7470 **Jungle Quest** 30. 7537 **Kolor Klips** 37.
- ★ **Penton Overseas ... 30 day MBG**
- VocabuLearn/ce Levels I & II (Span., Fren., Germ., Ital., Rus., Japan., & Heb.)** ... ea. 35.
- VocabuLearn/ce Level III (Span., Fren., Germ., Ital., Rus., & Japan.)**..... ea. 35.
- ★ **Personal Training Sys. ... 60 day MBG**
Training for System 7, Excel, Lotus 1-2-3, Persuasion, FileMaker Pro, PageMaker, Illustrator, FreeHand, Word, HyperCard, QuarkXPress, ClarisWorks & Mac ..ea. 59.
- Sierra On-Line**
- 3545 **EcoQuest**..... 35.
- 3552 **Leisure Suit Larry V or 7396 Red Baron** 39.
- ★ **SoftStream ... 30 day MBG**
- 4489 **Galactic Frontiers** 38.
- Software Toolworks**
- 4619 **Mavis Beacon Typing 1.3 (CP)**..... 32.
- ★ **Spectrum Holobyte ... 30 day MBG**
- 4835 **Tetris 1.3**.. 28. 3017 **Wordtris 1.0** . 27.
- 3459 **Falcon 2.2.2 or 8181 Vette 1.0** ... ea. 33.



★ HyperGlott Software ... 30 day MBG

Berlitz Think & Talk—Complete course teaches you to speak & understand a foreign language. Lively audio-CD dialogues, 100's of graphics & sound effects make learning fun. Incl. recording feature. (French, Spanish, Italian & German) **\$125.**

- ★ **Strategic Studies ... 30 day MBG**
- 3287 **Warlords (empires at war)** 34.
- StudyWare**
- ACT, GMAT, GRE or SAT Prep** ... ea. 29.
- 8098 **LSAT Prep**..... 35.
- ★ **Toyogo ... 30 day MBG**
- 7624 **NEMESIS Go Master 5.0**..... 38.
- 7623 **NEMESIS Go Master Deluxe 5.0** 99.
- ★ **Voyager ... 30 day MBG**
- 2809 **The Annotated Alice, 2836 Hitch Hiker's Guide to Galaxy, 2820 Jurassic Park** ea. 15.

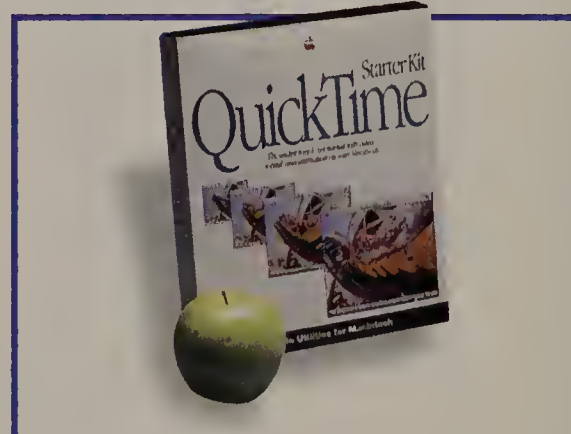
VIDEO AND SOUND MONITORS, MUSIC, ANIMATION

Articulate Systems

- 7013 **Voice Navigator SW w/Headset Mike**.. 325.
- 7014 **Voice Navigator SW w/Desktop Mike**.. 325.

Coda Music Systems

- 8188 **MusicPros**..... 189.
- 5604 **Finale**..... 549.



Apple Computer

7072 **QuickTime Starter Kit**—The quick and easy way to get started with video, sound, and animation on your Mac. Create, view, and edit movies within applications that support QuickTime..... **\$149.**

A whole hour



Insignia Solutions

3229 **SoftAT 2.5**—With SoftAT, you can run virtually any MS-DOS program on your Macintosh. You need no special hardware. With SoftAT, your next MS-DOS computer could be a Macintosh..... **\$299.**

★Macromedia ... 30 day MBG

- 5486 **Sound Edit PRO** 207.
- 4598 **MacRecorder Sound System PRO**... 239.
- 5087 **MacroMind Director 3.1** 799.
- 2246 **MacroMind Three-D 1.0**..... 999.

NEC

- 4252 **MultiSync 3FGx** 659.

PCTV

- 2244 **System 7 Video . 9.** 2245 w/Lon's Book 25.

RasterOps

- 9784 **RasterOps 24SX ..** 649. 8944 24STV 819.
- 8039 **Paintboard Li** 929.
- 7695 **24Mx.....** 1249. 7702 24MxTV 1799.
- 8392 **Sweet 16 Color Monitor** 1249.
- 7699 **Sweet 16 Video System** 1999.
- 7703 **Sweet 16 Live Video System**..... 2599.

Sigma Designs

- 6944 **Power Portrait (platinum)**..... 769.

Software Toolworks

- 5201 **The Miracle (piano teacher)** 349.

Sound Source

- 3547 **Star Trek: The Logical Collection** 32.
- 3607 **Star Trek: The Final Frontier** 32.
- 4920 **Star Trek: The Bundle (I gotta have both!)** 59.

★SuperMac Technology ... 30 day MBG

- 4122 **VideoSpigot LC** 379.
- 4114 **VideoSpigot IIsi** 379.
- 4164 **VideoSpigot (for NuBus)**..... 449.
- 7676 **VideoSpigot Pro. 1399.** 3691 Pro si 1299.
- 7679 **Spigot & Sound (NuBus)** 779.
- 7678 **Spigot & Sound Pro (NuBus)**..... 1649.
- 7677 **17" SuperMatch Multimode** 1149.
- 7675 **20-T" SuperMatch Multimode Trinitron** 2999.
- 1805 **20" SuperMatch Color Display** 1799.
- 5000 **20" Dual-Mode Trinitron** 2699.
- 4720 **21" Platinum Two-Display** 1099.
- 1877 **Spectrum/8LC or 2026 S/8si** ea. 536.
- 1844 **Spectrum/8 Series III 536.** 1851/24 Series III 1249.
- 2330 **Spectrum/8•24 PDQ or 2231 PDQsi** ea. 899.

CD-ROM

Broderbund

- 3730 **Just Grandma and Me (CD-ROM)**..... 34.

CD Technology

- 2321 **CD-ROM Caddy ... 11.** 2533 (5 Pack) 49.
- 8057 **Porta Drive CD-ROM**..... 579.

★Cyan ... 30 day MBG

- 2717 **Cosmic Osmo 1.1 (CD-ROM)**..... 37.

★Ergonomic Software ... 30 day MBG

- 7056 **Panoramix Vol. 1 (CD-ROM)**..... 69.

★Highlighted Data ... 30 day MBG

- 7771 **Webster's Dictionary (CD-ROM)**..... 159.
- 6968 **Footage '91 (CD-ROM)** 159.

★HyperGlot Software ... 30 day MBG

(French, German, Italian, or Spanish)

Berlitz Think & Talk (CD-ROM) ea. \$125.

★ICOM Simulations ... 30 day MBG

- 3717 **Sherlock Holmes, Consulting Detective** 38.

★METATEC/Discovery Sys. ... 60 day MBG

- 6823 **Best of MIDI Connection**..... 32.

- 3683 **Backpac Set 1 or 3679 Set 2**..... ea. 45.

★Multimedia Library ... 30 day MBG

- Image Series Vol. 1-4 (Russia/China, Tropics, Parades, Ancient Egypt).. ea. 105.
- 7313 **Sound Series V.1-Music for Multimedia** 105.

NEC

- 6577 **CDR-37 CD-ROM Portable Drive** 399.

- 6826 **General Reference CD-ROM Bundle** 529.

- 6582 **CDR-74 CD-ROM Drive** 579.

Software Toolworks

- 3915 **Grolier Encyclopedia (CD-ROM)** 249.

★Voyager ... 30 day MBG

- 3917 **A Silly, Noisy House CD** 39.

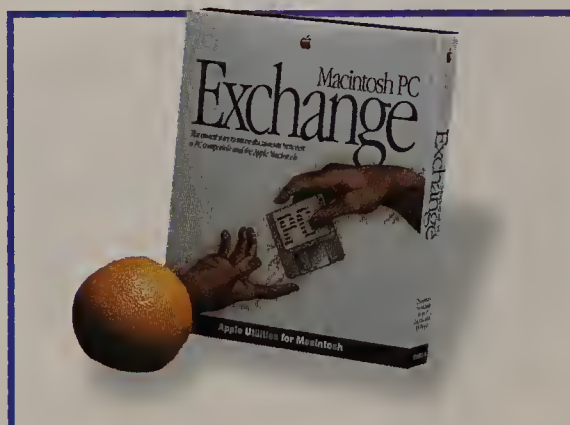
COMMUNICATIONS MODEMS, MAIL, NETWORKS

Apple Computer

- 7073 **Macintosh PC Exchange** 69.

- 7101 **AppleTalk Remote Access** 159.

- 7102 **AppleShare 3.0**..... 969.



Apple Computer

7073 **Macintosh PC Exchange**—Lets Mac computer users work with files stored on 3½" MS-DOS and Windows-formatted floppy disks. Move files between a Mac and a PC as easily as you can between two Macs **\$69.**

★Applied Engineering ... 30 day MBG

- 8362 **QuadraLink (with AE Shadow)** 205.

★Argosy Software ... 30 day MBG

- 7872 **Software Bridge/Mac 2.0.1** 99.

★CE Software ... 60 day MBG

- 8066 **QuickMail (5 user)** 249. 8067 (10) 375.

★CompuServe ... 60 day MBG

- 1676 **Macintosh Membership Kit 1.6** 25.

- 1673 **CompuServe Navigator 3.1** 49.

- 1674 **Membership Kit/Navigator Bundle** 72.

★DataViz ... 60 day MBG

- 4842 **MacLink Plus/Translator 6.0** 109.

- 1823 **MacLink Plus/PC 6.0** 129.

★Dayna ... 60 day MBG

- DaynaPORT TRX: (BNC or 10 BASE-T) ea. 87.

- DaynaPORT E: (BNC or 10 BASE-T) ea. 149.

- 8719 **EtherPrint 339.** 9888 (10BASE-T) ea. 339.

- 7888 **DaynaPORT E/II-3 Adapter**..... 199.

- DaynaPORT SCSI/Link (BNC or 10 BASE-T) 269.

Dove Computer

- 6758 **DoveFax 2.0 ..** 199. 3352 NuBus 229.

- 9634 **DoveFax Plus ..** 265. 4111 NuBus 299.

★Farallon Computing ... 30 day MBG

- Full line of EtherMac Cards available ... call

- 9805 **Timbuktu 4.0.2 or 4866 Remote 3.0** 129.

- 6273 **PhoneNET StarConnector 10-Pack** 129.



★Berkeley Systems ... 30 day MBG

- 5737 **After Dark 2.0V**—1992 Macworld World Class Award for Utility-System Enhancement. Stops screen burn-in..... **\$28.**
- 2198 **More After Dark (M.A.D.)** 23.
- 2196 **After Dark & M.A.D. Bundle** 39.

- 4869 **PhoneNET Connector 10-Pk (DIN8)**... 198.

- 9961 **PhoneNET Card PC** 209.

- 2206 **PhoneNET StarController 307**..... 879.

- 4802 **Star 357...** 1025. 4814 Star 377 ... 1299.

★Freesoft ... 30 day MBG

- 6115 **White Knight 11** 85.

★Global Village ... 30 day MBG

- 8946 **TelePort A300 2.1** 129.

- 8945 **TelePort/FAX 2.1** 145.

- 5327 **TelePort/Full FAX 2.1** 219.

- 7730 **PowerPort/Bronze** 219.

- 7720 **PowerPort/Silver 439.** 7710 /Gold 589.

Hayes

- 5101 **HayesConnect 3.0 (modem sharing)**.. 75.

- 2300 **Smartcom II for the Mac 3.3B**..... 84.

- 5971 **OPTIMA 24 Modem for Mac**..... 145.

- 5970 **OPTIMA 96 Modem for Mac** 389.

Insignia Solutions

- 7557 **Access PC 2.0** 60.

- 9726 **Entry Level SoftPC 2.5** 125.

- 4089 **Universal SoftPC 2.5** 195.

- 3229 **SoftAT 2.5**..... 299.

- 3441 **SoftNode 1.0 105.** 3454 (10 Pack) 699.

Logiccode Technology

- 5525 **Quicktel Xeba M9624XV** 169.

- 5524 **Quicktel Xeba M9696XV** 369.

- 5523 **Quicktel Xeba M1414XV** 399.

★Lotus Development ... 30 day MBG

- 7121 **cc:Mail Macintosh Platform Pack 2.0** 339.



★ASD Software ... 30 day MBG

- 7085 **FileGuard 2.7 (1 user)**—Protect your hard drives, applications, file/folders (including System folder) from unauthorized access, deletion, and/or illegal copying **\$138.**
- 7422 **(5 user)**.. 479. 7423 **(10 user)**.. 799.

MacConnection[®]

TRUTH, JUSTICE, SOFTWARE, AND PERIPHERALS SINCE 1984.

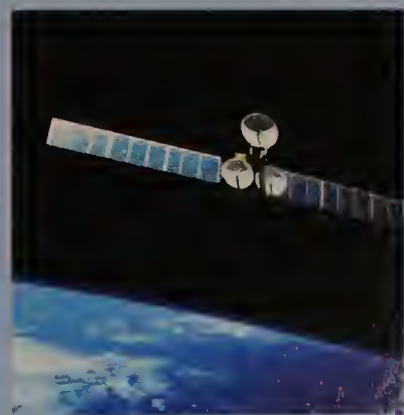
Mac TV[™]

OUR VERY OWN TV SHOW WITH DAZZLING DEMOS, TANTALIZING TIPS, AND THE LATEST MAC NEWS.

ON THE AIR!



Turn On.
Tune In.
Boot Up.



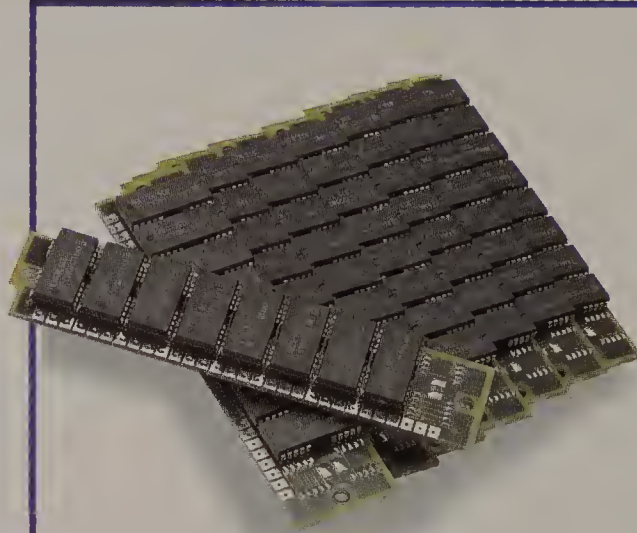
ANOTHER UNPARALLELED NEW SERVICE
FROM THE FOLKS WHO BROUGHT YOU
EVERYTHING OVERNIGHT[®] \$3,
TOLL-FREE TECHNICAL SUPPORT, AND
MONEY-BACK GUARANTEES!

CALL 800/800-6912 FOR PROGRAM INFORMATION.
(See 2-page ad preceding our product pages for more info.)

of Mac demos,

MASS Microsystems

- 3655 MASSim 24/96 (portable modem)..... \$185.
 ★Microcom ... 30 day MBG
 7459 CarbonCopy Mac 2.0.1 (single)..... 59.
 ★Microsoft ... 30 day MBG
 9444 Microsoft Mail 3.0 (1-5 user)..... 269.
 ★Practical Peripherals ... 30 day MBG
 8994 2400 V.42bis Modem 125.
 7934 PM9600SA Modem 1.26 289.
 9849 SmartPack 9600 (with Smartcom II). 349.
 ★Prometheus ... 30 day MBG
 2590 ProModem 2400 Mini Plus 129.
 4724 Home Office (24/96 w/Voice Mail).... 259.
 8990 Ultima Home Office (144/96) 489.
PSI Integration, Inc.
 3143 COMstation ONE 195. 3142 TWO .. 299.
 5340 COMstation FOUR 369. 6965 FIVE 549.
 ★Shiva ... 30 day MBG
 3444 NetSerial 1.35..... 275.
 4347 NetBridge or 4942 TeleBridge 399.
 6555 LanRover/L 599.
 NetModem/E (thick, thin, 10BASE-T) ea. 1479.
Sitka/TOPS
 4188 Teleconnector (DIN8) 23. 2230 (10). 189.
 6264 TOPS Network 3.1 187. 2419 (3-Pak) 249.
 ★Software Ventures ... 30 day MBG
 3455 MicroPhone II 4.0 209.



SIMMs ... with free video and manual
 RAM your Mac to System 7 specs and beyond. At the lowest prices around. All SIMMs come with a full 2-year warranty, plus a free installation manual and video. We also have 2 MB, 4 MB, and 6 MB PowerBook modules. So kick your Mac into overdrive and create huge spreadsheets and complex graphics with power to spare.

- 1107 1 MB SIMM (80ns) \$34.
 8316 1 MB SIMMs (80ns, set of 2)..... 67.
 9437 2 MB SIMMs (for IIse or LC)..... 63.
 7437 4 MB SIMMs (80ns) 119.
 7600 4 MB SIMMs (80ns, set of 4) 469.
 16 MB SIMMs (for Quadras, set of 4) call
 3742 PowerBook Modules (2 MB)..... 119.
 5090 (4 MB)..... 219. 5091 (6 MB) 299.



Hayes

5101 HayesConnect 3.0—Share modems or other serial devices over an AppleTalk network. Includes password security, activity logging, unlimited client support, as well as System 7, and Multifinder Toolbox compatibility .. \$75.

Caere

- 4476 OmniPage 459. 4930 Professional 649.
 7705 OmniPage Direct..... 259.

Calera

- 4981 WordScan 189. 4697 WordScanPlus 379.

CoStar

- Stingray ADB (platinum or black) . ea. 79.

★Curtis Manufacturing ... 30 day MBG

- 8046 MVP Mouse (MVP-1) 89.

★Datadesk ... 30 day MBG

- 9830 MAC101E 126. 2384 with QuicKeys 149.
 6901 Switchboard (modular keyboard)..... 159.

★Everex ... 30 day MBG

- 1144 Silhouette Trackball 1.0 (ADB Macs).. 78.
GDT Softworks

- 3429 BetterWriters 1.01 (software drivers).. 39.
 8297 BetterWriters Network 89.
 2499 PowerPrint 1.2.. 94. 8290 Network. 169.

Hewlett-Packard

- 6514 HP B&W DeskWriter (w/cartridge) 479.
 2964 HP Color DeskWriter C (w/color cart.)... 799.
 9993 HP LaserJet IIIP (requires kit) 1099.
 6754 HP LaserJet III (requires kit)..... 1599.

★Kensington ... 30 day MBG

- 2547 Turbo Mouse 4.0 ADB 107.

Keytronics

- 6974 Mac Pro Plus Keyboard..... 139.

Kraft Systems

- 7519 KM30 Trackball..... 42.



★Applied Engineering ... 30 day MBG

5290 Plus Drive—100% FDHD compatible drive for the Mac Plus and SE. The Plus Drive installs through the floppy connector and doesn't require a SWIM chip upgrade..... \$299.

★Logitech ... 30 day MBG

- 1671 MouseMan.... 77. 1672 TrackMan. 89.
 5082 ScanMan Model 32 G-Scale Scanner 299.
 7112 FOTOMAN w/Digital Darkroom..... 639.

★MicroSpeed ... 30 day MBG

- 2807 MicroTRAC ADB (for SE & II family) .. 57.
 6621 MacTRAC ADB 2.0 (SE & II family).... 75.

★Microtek ... 30 day MBG

- 1978 Scanmaker 600GS 849. 1985 600ZS 1399.

Monster Design Group

- MacSpeakers (two, stereo) 169.

★Mouse Systems ... 30 day MBG

- 7520 Little Mouse or Little Mouse Plus ea. 68.
 9471 A³ Mouse..... 74.

NEC

- 5377 SilentWriter Model 95 1439.

★Orange Micro ... 30 day MBG

- 3036 Grappler 2.3 92. 3692 IIsP 115.

★Sophisticated Circuits ... 30 day MBG

- 8009 PowerKey 2.01 76 8008 Remote... 32.
Thunderware

- 4994 LightningScan 400 359. 3107 Pro 256 499.

UPGRADES & DRIVES MEMORY, ACCELERATORS

SIMMs ... with free video & manual

- 8316 1 MB SIMMs (80ns, set of 2)..... 67.
 9437 2 MB SIMM for IIsi or II LC ea. 63.
 7437 4 MB SIMMs (80ns) 119. 7600 (set of 4) 469.

★Applied Engineering ... 30 day MBG

- 1971 FastMath LC 109.
 8361 1.44 MB High Density Drive 229.
 2532 QuickSilver Accelerator for the IIsi 269.
 5290 Plus Drive (FDHD for Plus & SE) 299.

TransWarp Series:

- 3319 SE (25 MHz) 799. 3317 (40 MHz).. 1479.
 4147 LC (33 MHz) 999. 4903 (40 MHz).. 1329.
 7321 CI (50 MHz) 1329. 7322 (w/FPU)... 1599.

★Dayna ... 60 day MBG

- 8722 DaynaFile II 1.2 5 1/4" Drive..... 429.

★DayStar Digital ... 30 day MBG

Does not include optional math chip.

- 3584 DualPort IIsi with 20 MHz 68882 165.
 8556 FastCache for Mac IIsi..... 265.

- 1613 FastCache 040 (for Quadra)..... 349.
 3401 FastCache IIsi 299. 3389 w/FPU... 369.

- PowerCache for SE/30, II, IIsx, IIsx, IIsi, LC
 40 MHz 859. 50 MHz..... 1349.

★FWB, Inc. ... 30 day MBG

- 2329 PocketHammer 100 699. 2314 PH 240.1199.
 2333 Hammer Internal 100is 549. 2334 240is. 979.
 7991 HammerDisk 1000FMF 2279.
 7319 HammerDisk 130 (optical)..... 1599.

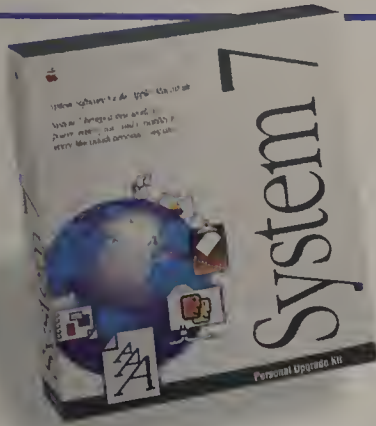
INPUT/OUTPUT

KEYBOARDS, MICE, TRACKBALLS, PRINTERS & SCANNERS

★Appoint ... 30 day MBG

- 2760 Thumbelina Mac (mini 3 button mouse) 65.
 2769 MousePen Pro Mac..... 65.

news, and tips.



Apple Computer

1074 **System 7 Personal Upgrade Kit**—Add powerful new capabilities like Publish and Subscribe, MultiTasking, Balloon Help, Virtual Memory, and more to your existing system while also making it easier to use **\$79.**

IOMEGA

- 6499 90 MB Transportable (reqs. interface). 679.
- 2467 90 MB Gold Std. Rem. Cart. (Qty. 3)... 439.
- 7789 **Mac 1B Interface (w/Central Pt. Backup)** 39.
- 2466 **Mac 2B Interface (with Retrospect)** .. 149.

MASS Microsystems

Diamond External Hard Drives:

- 2973 120 MB HD . 629. 2972 210 MB HD 1029.
- 2969 320 MB HD 1499. 2952 510 MB HD 2119.
- 5898 1" 80 MB Port...449. 5899 120 MB.. 559.
- 3678 120 MB Port. 569. 3663 210 MB Port. 979.
- 3662 320 MB Port. 1549. 3659 510 MB Port. 1999.
- 3657 HitchHiker Portable Drive (40 MB) 479.
- 3656 HH (80 MB) 749. 7008 HH (120 MB) 899.

★MDS Drives ... 60 day MBG

- 5533 MDS 44 SyQuest w/AutoDoubler 479.
- 5532 MDS 44 SyQuest w/Norton Utilities..... 479.
- 5534 MDS 88 SyQuest w/AutoDoubler 589.
- 5535 MDS 88 SyQuest w/Norton Utilities..... 589.
- 5529 44 MB Cart.(3 pak) 199. 5528 (5 pak) 329.
- 5531 88 MB Cart.(3 pak) 312. 5530 (5 pak) 512.

Peripheral Land, Inc. (PLI)

- 6432 3½" Optical Media 65.
- 1866 Quick SCSI Card (requires cable) 319.
- 8335 PLI TurboFloppy 1.4 295.
- 8327 PLI Infinity 40 Turbo (removable) 599.
- 9752 PLI Infinity 88 Turbo (removable) 729.
- 4645 PLI Infinity MO 3.5" Optical Drive 1649.
- 2864 PLI Infinity Floptical Drive (21 MB) 479.



Apple Computer

7101 **AppleTalk Remote Access**—Remote locations can gain access to information and resources on other AppleTalk networks **\$159.**

7102 **AppleShare 3.0**—Share files & printers over AppleTalk networks. Supports Multitasking **969.**

- 2865 Floptical Cart. (21 MB) 35. 2899 (10 pak) \$299.
- 2644 PLI 52 MB External Hard Drive 449.
- 8330 PLI 105 MB (Quantum) 599.
- 7933 PLI 212 MB External Mini HD..... 799.
- 7123 85 MB..... 419. 7124 120 MB..... 539.
- 7125 330 MB... 1399. 7145 520 MB..... 1699.
- 7140 670 MB... 1999. 7122 1.26 GB..... 2699.

MEDIA

★Fuji ... 60 day MBG

- 2214 3½" DS Disks (10) 9. 2242 (50).... 32.
- 2215 3½" HD Disks (10) ... 15. 2241 (50) ... 59.
- 4863 3½" HD Disks (20) with storage case.... 26.
- 2243 3½" Color (10) DS 10. 2239 (10) HD... 18.

★Sony ... 60 day MBG

- 3297 3½" DS Disks (10) 9. 6148 (30)..... 25.
- 3298 3½" HD Disks (10) .. 15. 6375 (30) 42.
- 1603 DG60M 16. 2520 DG90M..... 22.
- 8185 QD2040..... 14. 1895 QD2120..... 21.

★SyQuest ... 60 day MBG

- 5912 44 MB Cartridge (1) 68. 5529 (3) . 199.
- 5528 44 MB Cartridge (5)... 325. 9728 (10) 639.
- 3603 88 MB Cartridge (1)... 105. 5531 (3) . 309.
- 5530 88 MB Cartridge (5)... 499. 3600 (10) 989.

★3M ... 60 day MBG

- 3943 DC2000..... 17. 1581 DC2120 23.



★SyQuest ... 60 day MBG

Cartridges for SyQuest removable drives.

- 5912 44 MB Cart. . **\$68.** 5529 (3 Pack). **\$199.**
- 5528 (5 Pack) **325.** 9728 (10 Pack). **639.**
- 3603 88 MB Cart. . **105.** 5531 (3 Pack)... **309.**
- 5530 (5 Pack) **499.** 3600 (10 Pack). **989.**

ACCESSORIES

TONERS, CASES, DUST COVERS

American Power

- 3447 SurgeArrest Plus 39.

Apple Computer

- 9773 StyleWriter Ink Cart. 22. 8499 (3 Pack) 59.
- 7748 Personal LaserWriter Toner Cartridge .. 87.
- 1115 LaserWriter II Toner Cartridge..... 105.

★Avery ... 60 day MBG

- 7050 Avery 5660 (1" x 2 5/8"-Clear Adrs.-Laser) 32.
- 5392 Avery 5196 (3½"-Disk Labels-Laser)..... 29.

★Curtis Manufacturing ... 30 day MBG

- 8973 Apple Security Kit (SL-2)..... 22.

★I/O Design ... 30 day MBG

- 8812 Ultimate Classic Carrying Case..... 64.
- 1941 Ultimate LC Carrying Case..... 95.

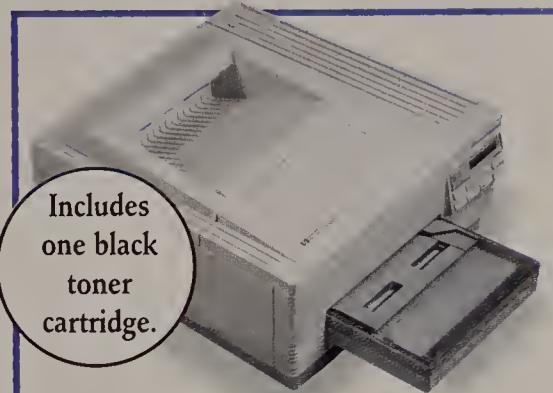
★Kensington ... 30 day MBG

Full line available. Partial listing.

- 4973 Power Tree 20..... 24.
- 2559 Apple Security Kit 33.
- 6763 Mac SE Anti-Glare Filter..... 52.
- 3623 Apple 12" Anti-Glare Filter..... 63.

★Moustrak ... 60 day MBG

- 2694 Moustrak Pad (7"x9") 8. 2692 (9"x11") . 9.
- 2693 Moustrak Pad Low Friction (9" x 11").... 10.



Includes one black toner cartridge.

Hewlett-Packard

6754 **HP LaserJet III**—Exclusive Resolution Enhancement technology with 300 dpi sets a new standard. Prints up to 8 pages per minute as well as holding up to 5 MB of memory. Scalable typefaces and more built in.. **\$1599.**

★Targus ... 60 day MBG

- 3617 Mac Classic/Plus/SE Case 59.
- 4015 Mac SE & Ext. Kybd. Carrying Case 75.

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order (in the U.S.).
- No sales tax, except Ohio residents (please add applicable tax).
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped First Class Mail.
- International orders U.S. \$100 minimum. Manufacturer support and upgrade eligibility may be limited outside the U.S.A.
- Upon receipt and approval, personal and company checks clear the same day for immediate shipment of your order.
- Corporate P.O.s accepted subject to credit approval.
- COD maximum \$1000. Cash or certified check.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices and promotions subject to change without notice.
- Our order lines are open continuously from 8:00 a.m. Monday until 5:00 p.m. Sunday Eastern Time. You can call our business offices at 603-446-7711 Monday through Friday 9:00 a.m. to 5:30 p.m. Eastern Time.

SHIPPING

Continental U.S.: The total freight charge on any order placed with MacConnection is only \$3. Barring events beyond our control, all credit card orders phoned in weekdays by 3:15 a.m. Eastern Time will ship Airborne Express for delivery the next business day. Which means *same day* delivery for orders placed between midnight and 3:15 a.m. Eastern Time. (Some orders may ship by UPS Ground for next day delivery). Saturday delivery available to many areas upon request at no additional charge. Order all day Saturday through noon on Sunday for Monday delivery. Some areas require an additional day delivery.

Hawaii, Alaska, Canada, Puerto Rico and the U.S. Virgin Islands: Call 800-800-3333 for information on shipping and charges.

All other areas: Please call 603-446-3333 or FAX 603-446-7791 for information.

PROJECT POWER.



Actual MediaPro image NTSC video.



MEDIAPRO. The universal presentation device brings power to your presentations. Power to your meetings. Power to your training sessions. The MediaPro™ multiple source active matrix LCD projection panel from nVIEW Corporation projects from nearly any video source—computer or conventional video—in brilliant, true color. Connect up to four video sources to the MediaPro. Switch sources at the touch of a button. Room to room, country to country, the MediaPro is universally compatible and completely portable. No bulky equipment, no complicated set-up, no technicians. Pure Power.

nVIEW Corporation also has the ViewFrame® line of LCD projection panels to project power from your computer. Whether you need the gray scale projection of the ViewFrame II+2, or the 32,000 colors of the new ViewFrame SpectraPlus for stunning 3-D animation, nVIEW products are unparalleled in performance, compatibility, and packaging.

To project power at your next presentation, meeting, or training session, arrange for a demonstration of the nVIEW product that is right for you. Call 1-800-736-8439. nVIEW Corp., 11835 Canon Boulevard, Newport News, Virginia 23606.



FEATURES	3-Gun CRT Projector	MediaPro
Brilliant, Crisp Images	■	■
Lightweight and Portable		■
International Video Standards	■	■
IBM and Mac Compatible	■	■
Multiple Sources	■	■
Economical		■
Easy To Use		■
Easy To Set Up		■
Convenient		■

ViewFrame is a trademark of nVIEW Corporation. nVIEW products are manufactured under U.S. Patent #4,763,993 and #4,976,536. Other and foreign patents pending *

Circle 117 on reader service card

All Thumbs

BY STEVEN LEVY

UICEOVER: Are you ready, America? Have you upgraded your hard drives? Expanded your memories? Have you installed QuickTime, Apple Computer's amazing system extension for running often-postage-stamp-size video clips on your own computer screen? If so, you're ready for "Queak Previews," where your two favorite critics introduce you to all the hot clips and then make often indefensible pronouncements about them! Here they are . . . Geeeeee and Roger!

ROGER: We've got to lose that announcer.

GENE: You've got to lose some *weight*. Or do you have a few loaves of bread stuffed under that sweater?

ROGER: Obviously, the last 20 hours of decompressing QuickTime files has gotten to Gene. Believe me, we had a hell of a time getting these things onto our system. They came on CD ROM, SyQuest cartridges, bundles of high-density floppies, and high-capacity hard drives—but we finally have everything ready for our old reliable MoviePlayer. And may I say that multimedia has never been better?

GENE: You may, but we're running late already. So here's the first clip, which appeared on the ever-popular Apple Computer QuickTime Developer's Disk. It's called *Engineers in the Shower*.

Gene and Roger turn toward a wall-size monitor in the front of the room, displaying the Mac desktop. A small portion of the screen shows the clip.

Location: A communal bathroom with three shower stalls, side by side. Several males, approximately in their late twenties, wearing T-shirts and baggy jeans, are frantically running into the showers, fully clothed. (The water is off.) Then they immediately run out of the stalls, slamming the flimsy frosted-glass shower doors. The sounds are a jangly, metallic clatter of doors slamming, the feverish patter of sneakers on bathroom tile, and the heavy breathing of people unaccustomed to physical exertion. Finally one leans to the camera and

says, "These are trained professionals—don't try this at home." Soon thereafter, as they breathlessly scuttle out of the room, we hear a giggly voice asking, "Are we recording?"

ROGER: Gene, this is just another one of those teen-oriented QuickTime clips, where a bunch of adolescents turn on a video camera, act like morons, and think it'll be considered clever when everything is digitized and stuck on a Macintosh. Where are the new ideas? Is this the golden age of media? To me, this is a big thumbs-down.

GENE: Once again, Roger, you miss the point. I find *Engineers in the Shower* to be a hard-hitting yet poignant exposé of the working conditions at one of the country's most admired computer companies. Working 90 hours a week trying to create a new era in computer media has obviously driven these young wage-slaves to the point of insanity. They're scrambling like rats in a cage! The amazing thing is how their employer slyly placates them—by allowing them to tape their own mental breakdowns with a cheap camcorder, and then actually including the clip in a CD ROM distributed by the company! Besides, I think it's fun, especially since the choppy images give it a fast-forward, Mack Sennett feeling.

ROGER: Gene, don't you know that almost every QuickTime clip is choppy like that? Unless you run them on a Quadra 950?

GENE: Well, to me it's still a thumbs-up. Now, our next clip is bound to be controversial. In the spirit of Oliver Stone's *JFK*, comes *11/23/63 Extra!* It's a HyperCard stack that professes to prove, beyond all doubt, that the Kennedy assassination was a conspiracy. And the linchpin of all this is the Zapruder tape, which is included as a QuickTime clip.

They turn to the monitor. The familiar, if unusually blurry, image of the presidential limo that day in Dallas, after the first shot. Kennedy's head is bowed, and

Jackie, in pink suit and pillbox hat, is cradling him. Suddenly part of his head seems to explode, and he is violently thrown backward.

ROGER: Now, that was only part of the Zapruder film, but the clip's creator promises to digitize the entire thing later on. What makes this unusual is that the viewer can play with the film with a utility called QuickTime Detective, which supposedly helps you prove the original film has somehow been tampered with.

GENE: I vote for a thumbs-down. How do we know that the QuickTime clip hasn't been tampered with?

ROGER: Good point. Using QuickTime and a program like Adobe Premiere, one can manipulate images all sorts of ways, altering reality. Just because you see something on a video doesn't mean it happened. What if this guy is *part of the conspiracy*, and he painstakingly flipped the digits to make it look like John Connally shot the president? Still, this is a good example of how QuickTime clips can vividly portray historical moments. Thumbs-up.

GENE: I'm glad you mentioned Premiere, because Adobe includes a CD ROM loaded with QuickTime clips. Here's an example, called *Evening*.

First we see a pearl necklace, then an empty dress of the short black variety. The dress is suddenly filled with a woman, a model who is sort of a low-rent Annette Bening. We get a brief glimpse of someone else, but mostly this is a one-woman show, a montage of views of the woman in her skimpy dress. The most dramatic shot is an upward pan—tote to hair—that follows her curves. There are lots of fades, double exposures, zooms, and the like. The sound track is a deep Hammond organ, playing moody R & B.



Live!

*Gene and Roger
rate*

QuickTime

clips

GENE: Sort of an MTV clip. I give it a thumbs-down.

ROGER: Try VH-1. But I like it anyway. Thumbs-up.
continues

GENE: Funny, though. Did you ever notice how much QuickTime clips are engineered to the low attention spans of MTV viewers? Since it's extremely difficult to accommodate clips longer than 20 seconds or so, the creators wind up stuffing in all sorts of special effects, quick cuts, and gimmicks.

ROGER: Yeah, a lot of stunts with text, too. I think artist Jenny Holzer is the patron saint of QuickTime artistry.

GENE: And also, as we see in *Evening*, a focus on sex. Is it inevitable that the cutting edge of every visual media winds up as lurid exploitation of the female body?

ROGER: Is this a politically correct diatribe? Have you been reading *Backlash*?

GENE: Wake up and smell the coffee, Roger. You won't believe how quickly sleaze has oozed into the world of QuickTime clips. Let me show you this Quick-

Time 4th Dimension database that a fellow named Craig Hosoda entered into the Macworld QuickTime Festival.

ROGER: Craig Hosoda? Isn't that the guy who wrote that book *The Bare Facts Video Guide*, that identifies and rates the nude film appearances of every actor and actress in Hollywood? That's a great book!

GENE: You *would* think so, Roger. Here's his database.

The 4D interface comes on the screen. Roger, working a keyboard, begins typing in the name of Jodie Foster. A record exists that lists her movies and shows a picture of her. Roger points-and-clicks at the picture, which is from the film Backtrack. It shows Foster exiting a shower. She is dressed appropriately for the scene.

ROGER: A big thumbs-up. Just imagine what the perverts who swap porno TIFF files on the networks will do with this technology!

GENE: Don't imagine, it's happening already. My thumb goes down. Now for a final word, from Apple's QuickClips CD ROM disc. It's a little piece called *Sculley*.

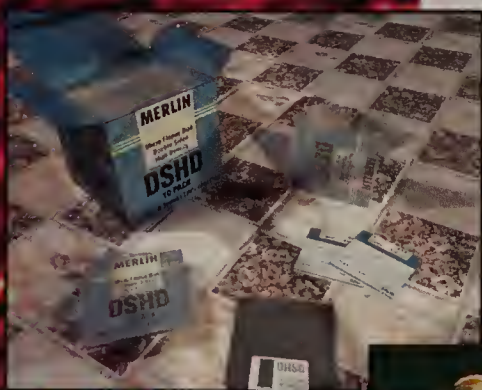
A black screen fades into a tight head shot of Apple chairman John Sculley, seated in a busy office, wearing a dark suit and a green tie. Somewhat tentatively, he makes the following prediction, presumably about QuickTime: "I believe that it is an important enough new technology that it's going to create not just a series of businesses, it's probably going to create an entire industry. If you go out 15 years from now, people probably won't talk about the computer industry as they do today, uh, they'll probably talk, um, about, uh, the tools industry, which will include interactive multimedia. . . . They may talk about the information management industry, um, but we'll probably have a different nomenclature 15 years from now. . . ."

ROGER: It kind of reminds me of one of the witnesses in that Warren Beatty movie *Reds*. Or one of the speakers in *The Sorrow and the Pity*. Searing stuff. I give it a thumbs-up.

GENE: It's thumbs-down for me. Roger, don't you get it? You're looking at the presentation but not following the content. Try to comprehend what the man is saying. Do you really believe that QuickTime is going to change the industry so much so that it will explode the computer industry into an array of other industries?

continues

SELL THE IDEA WITH INFINI-D™



High quality 3D graphics are taking the world by storm, creating a powerful new medium to visualize, present and sell ideas.

Infini-D's design-oriented modeler, photo-realistic renderer, and easy-to-use animator have been praised by industry experts and novices alike for bringing professional 3D graphics into reach. Whether you use 3D now, or are looking for the right place to start, Infini-D's unassuming interface will

enable you to create dazzling images and animations you never thought possible from your Macintosh®.

Infini-D has become the tool of choice in broadcast media, package design, advertising, and other professions where success depends on the persuasive communication of ideas.

Sell the idea. With Infini-D.



MW
EDITORS'
CHOICE

SWIVEL 3D™ UPGRADE OFFER

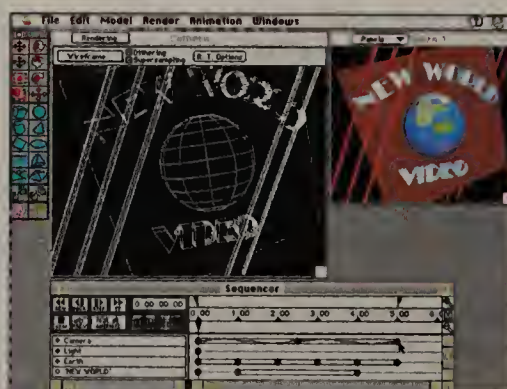
Any Swivel 3D user can upgrade to Infini-D for only \$395! Call us today if you want to end Swivelization!

FREE INTERACTIVE DEMO TOUR

Call (413) 549-7600, and we'll send you a free interactive demo tour showing how Infini-D can transform your ideas into reality.

INFINI-D 2.0!

A blistering-fast new renderer, broadcast quality anti-aliasing, EPS import and QuickTime™ support!



Infini-D has the tools you need to create the professional quality 3D graphics your clients want.



Specular International

233 North Pleasant Street • P.O. Box 888
Amherst, MA 01004-0888
Phone (413) 549-7600 • FAX (413) 549-1531

"The Wheel" ©1992 Steve Mockensturm/Toledo, OH. Infini-D™ is a trademark of Specular International, Ltd. Macintosh® is a registered trademark of Apple Computer, Inc. Swivel 3D™ is a trademark of MacroMedia, Inc. ©1992 Specular International, Ltd. All rights reserved.

Circle 112 on reader service card

Unlimited connect time to access CompuServe basic services, now only \$7.95 a month.

You can start with the basics at a flat monthly rate, with extended services available on a pay-as-you-go basis.

For more information about CompuServe's new basic services, just mail this card, or call 1 800 848-8199.

Name _____

Address _____

City, State, Zip _____

Telephone (_____) _____ **CompuServe®**

MacWorld/Oct.

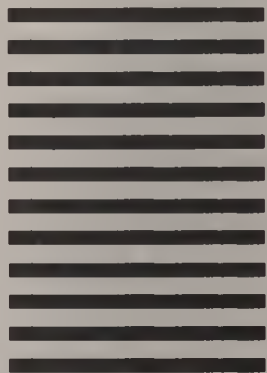


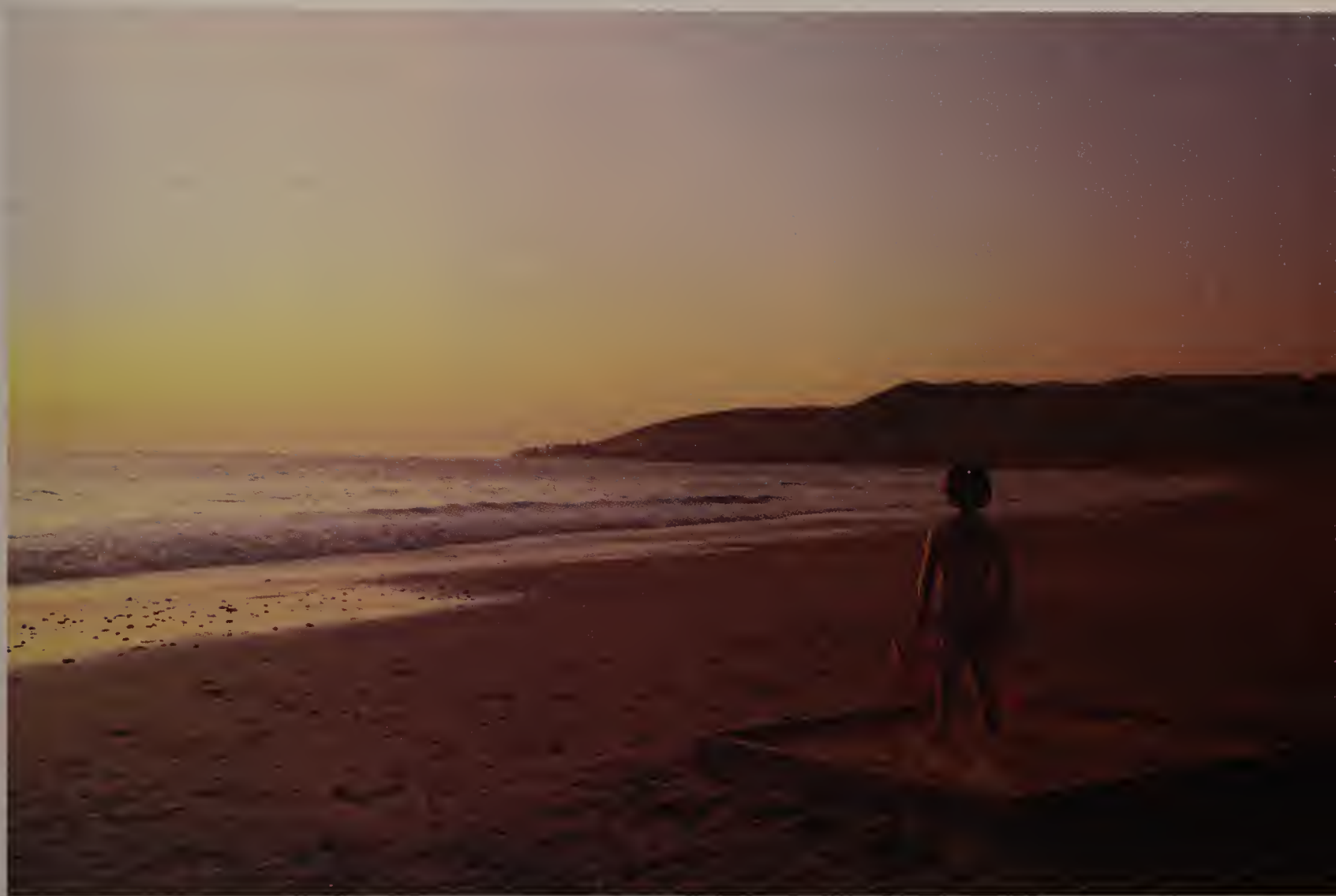
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 407 COLUMBUS, OHIO

POSTAGE WILL BE PAID BY ADDRESSEE

CompuServe®
ADVERTISING DEPARTMENT
PO BOX 20212
COLUMBUS OH 43220-9988





With CompuServe, you'll always have more to look forward to.

It's one thing to discover something you like. But to realize there's more of it than you ever imagined is even better. And that's what CompuServe is all about.

Tap into travel information, hotel reservations, stock quotes, hardware and software support, a shopping mall, the news, interactive games, and forums. For the experienced user, there's even free software and shareware. On-screen menus and an index make it all easy to access, so you get the most out of your time and money.

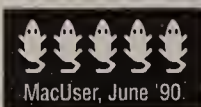
A one-time membership fee and \$7.95 a month let you use our basic services as often as you like: news, sports, weather, shopping, reference materials, our E-mail service of 60 messages a month, and more. Plus, there's a whole universe of other services available at nominal additional charges.

For more information or to order, see your computer dealer or call 1 800 848-8199. Outside the United States, call 614 457-0802. Because no information service lets you dig deeper or farther than CompuServe.

CompuServe®

The information service you won't outgrow.

As far as Apple is concerned, only one table can support the family.



Apple® calls it "The perfect place to put your computer to work." It's sturdy, ergonomic and carefully designed around Apple's modular footprint to fit the Mac family *plus* peripherals. Call today for a free catalog of our complete line.

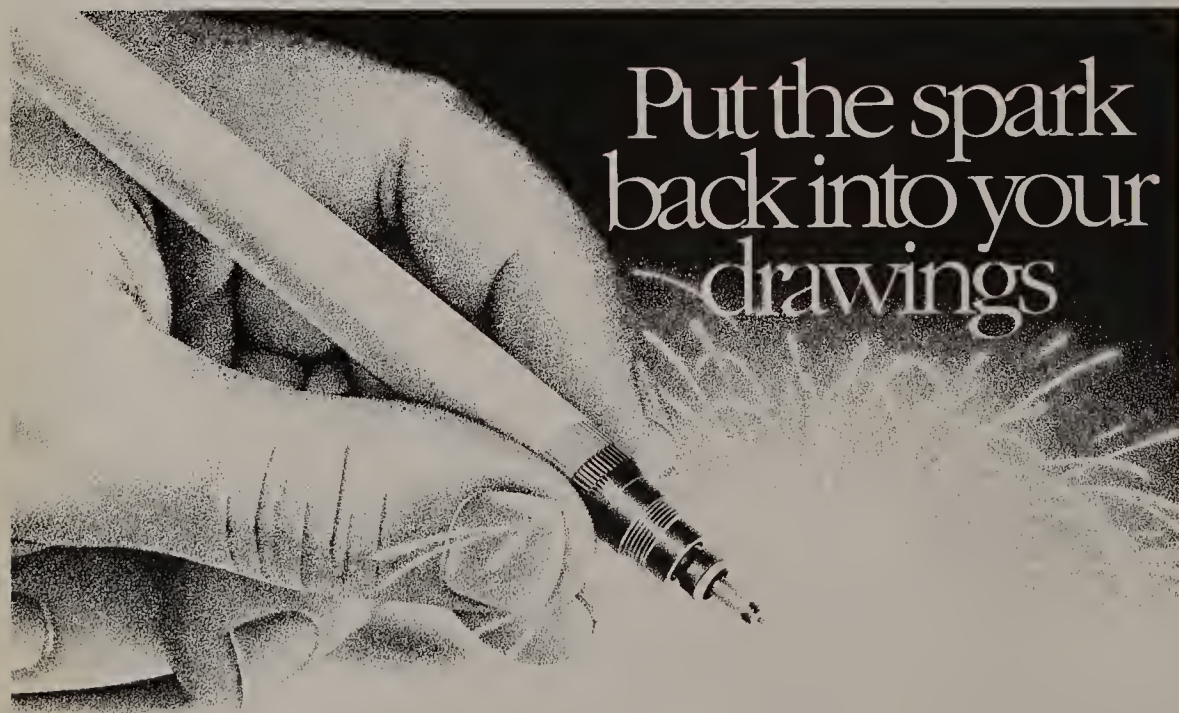
MacTable®
☎ 800-722-6263
or 206-481-5434 in WA state



ScanCo

P.O. Box 3217, Redmond, WA 98073-3217

MacTable design is patent pending.
MacTable is a trademark of Scandinavian Computer Furniture, Inc. Apple is a trademark of Apple Computer, Inc.



Put the spark
back into your
drawings

with PowerDraw, accepted worldwide as the professional 2D CAD standard for the Macintosh. Fast. Intuitive. Elegant.

PowerDraw™
By Engineered Software

For free brochure, call Engineered Software. 1-919-299-4843.
In Canada, call Evoy & Associates. 1-204-453-8111.

Circle 12 on reader service card.

ROGER: Who knows what the computer industry will be in 15 years? But I do know one thing—QuickTime does teach us that integrating video technology into computer media is much, much harder than anyone suspected. I think Apple has done a great service by making it possible to use QuickTime clips, and one day in the not-too-distant future we will all have powerful enough computers, video add-in boards, and enough storage space to make use of it without going through the terrible contortions we suffer with now. And, ideally, all that horsepower will be affordable. On the other hand, if you want to make a statement as Sculley does, I still think that the way to do it is to write it down and edit it. To be honest with you, I had to watch that clip four times before I really understood what he was saying. The first three times I saw it, all I noticed was that somewhere in the background a guy in a yellow shirt was walking across the office.

GENE: Roger, you actually seem to be making sense here. Let's wrap up the show while we're still ahead.

ROGER: Can't we watch that Jodie Foster clip one more time?

GENE: Only if she grants Craig Hosoda permission to exploit her image in that manner.

ROGER: Get *permission* for stuff you picked up from a VCR movie to use in a QuickTime clip? Dream on.

GENE: Wrong again, Roger. It's only a matter of time before the Multimedia Police elbow into the game and put the hammer down on all the fun. It'll be thumbs-down on piracy.

ROGER: Maybe by then our computer will be powerful enough to run QuickTime clips big enough to fill the screen, and they won't be choppy!

VOICEOVER: You can bet on it, Gene and Roger! In the future Multimedia will be Nirvana on Earth! We'll have new nomenclatures! And a document, be it a spreadsheet or a press release, won't *be* a document without at least one QuickTime clip!

GENE and ROGER (*in unison*): We've got to lose that announcer!

Fade to black. **m**

STEVEN LEVY's most recent book is *Artificial Life* (Pantheon, 1992).

STATISTICA/Mac

NEW rel. 3.0

STATISTICA/Mac™ A complete statistical data analysis system with hundreds of presentation-quality graphs integrated with all procedures ■ In-depth, comprehensive implementations of: *Exploratory techniques; Descriptive statistics; Frequency tables; Large selection of nonparametric tests; Stepwise multiple regression methods with extended diagnostics; General nonlinear estimation (with predefined or user-specified models); Logit/Probit analysis; General implementation of ANOVA/ANCOVA/MANOVA/MANCOVA (designs of practically unlimited complexity, repeated, nested, incomplete, random, changing covariates, contrast analyses, post-boc tests, custom designs); Discriminant function analysis statistics; Canonical analysis statistics; Time series modeling techniques with forecasting; Factor analysis with rotations; Cluster analysis (incl. hierarchical, k-means, and 2-way joining); General survival/failure time analysis (incl. life tables, group comparisons, and regression models); Distribution fitting (a large selection of continuous and discrete distributions); Curve and surface fitting and smoothing (incl. spline, DWLS, NEXP, and others); and much more* ■ Manual with comprehensive introductions to each method and step-by-step examples (Quick Start booklet explains all major conventions); balloon help ■ Extensive data management facilities: a super-fast spreadsheet of unlimited capacity with formulas (and Publish and Subscribe); merge/split files; "double identity" of values (numeric/text); BASIC-like data transformations programming language; Import/Export data and graphs from/to Excel, MacSS, CSS and other formats ■ Graphs integrated with all procedures (e.g., click on a correlation coefficient to produce the corresponding scatterplot and other graphs; click on a variable in the descriptive statistics table to produce a histogram and other graphs; click on an interaction effect in the ANOVA table to see a plot of interaction) ■ Large selection of 2-dimensional graphs: *Histograms (incl. multiple, clustered breakdowns, overlaid functions); Scatterplots (incl. multiple, weighted frequency, smoothed, function fitting); Multiple line and Range plots; Trend plots; Standard deviation plots; Data sequence diagrams; Contour plots; Box-and-whisker plots; Column plots; Bar graphs; Double pie charts; Scrollable dendrograms; Two-way joining plots; Curve fitting plots; Distribution comparison plots; Range plots; Probability plots; Amalgamation plots; Factor space plots; Casewise outlier and residual diagrams; ANOVA interaction plots; Multivariate (multiple) matrix plots; exploratory Draftsman plots with histograms, and many other specialized plots* ■ Large selection of 3-dimensional graphs: *3D surface plots (with data smoothing procedures, color or gray-scale shading, and projected contours); 3D scatterplots; 3D block scatterplots; 3D axis (space) plots; 3D spectral plots with adjustable planes; 3D line/ribbon plots; 3D sequence block plots; 3D histograms; 3D surface-smoothed frequency plots; and 3D range plots ("flying boxes")* ■ All 3D plots displayed in true perspective, feature interactive real-time rotation facilities (incl. continuous rotation) ■ Extensive graph customization options: all structural aspects of graphs (axes, scaling, patterns, colors, sizes, styles, regions, perspective, rotation, fitted functions, etc.); MacDraw-style tools with specialized "objects"; hi-res graph and artwork embedding; page layout/preview; dynamic rulers; Publish and Subscribe graph links ■ All output displayed in Scrollsheets™ (dynamic, internally scrollable tables: all numbers can be instantly converted into a variety of on-screen customizable, presentation-quality graphs) ■ All Scrollsheets can be saved into data files and used for input, or exported ■ Flexible facilities to perform analyses on specific subsets of data ■ Extremely large analysis designs ■ Unlimited size of files ■ Extended precision ■ Unmatched speed (e.g., on a Mac IIx, arbitrary rotation of a surface with 1,000 points takes 1 second; correlation matrix 50x50 with 100 cases—less than 3 seconds; transposing a 5,000 data points file—less than 2 seconds) ■ Full support for System 7 ("savvy") incl. "Publish and Subscribe," Apple events, balloon help, "drag and drop," 32-bit, Quadra cache, etc. ■ Price: \$595.

Quick STATISTICA/Mac™ A subset of STATISTICA/Mac ■ All basic statistical modules of STATISTICA/Mac (*Basic and Descriptive Statistics; Frequency tables; Exploratory data analysis; Nonparametrics; Distribution Fitting; Stepwise multiple regression; ANOVA/ANCOVA*) ■ Manual with comprehensive introductions to each method and step-by-step examples (Quick Start booklet explains all major conventions) ■ All data management facilities of STATISTICA/Mac ■ All graphics facilities of STATISTICA/Mac (including interactive rotation of all 3D graphs, extensive on-screen graph customization facilities) ■ Price: \$295.

DOS versions also available (can exchange data with Macintosh versions): STATISTICA/DOS™ \$795; Quick STATISTICA/DOS™ \$295.

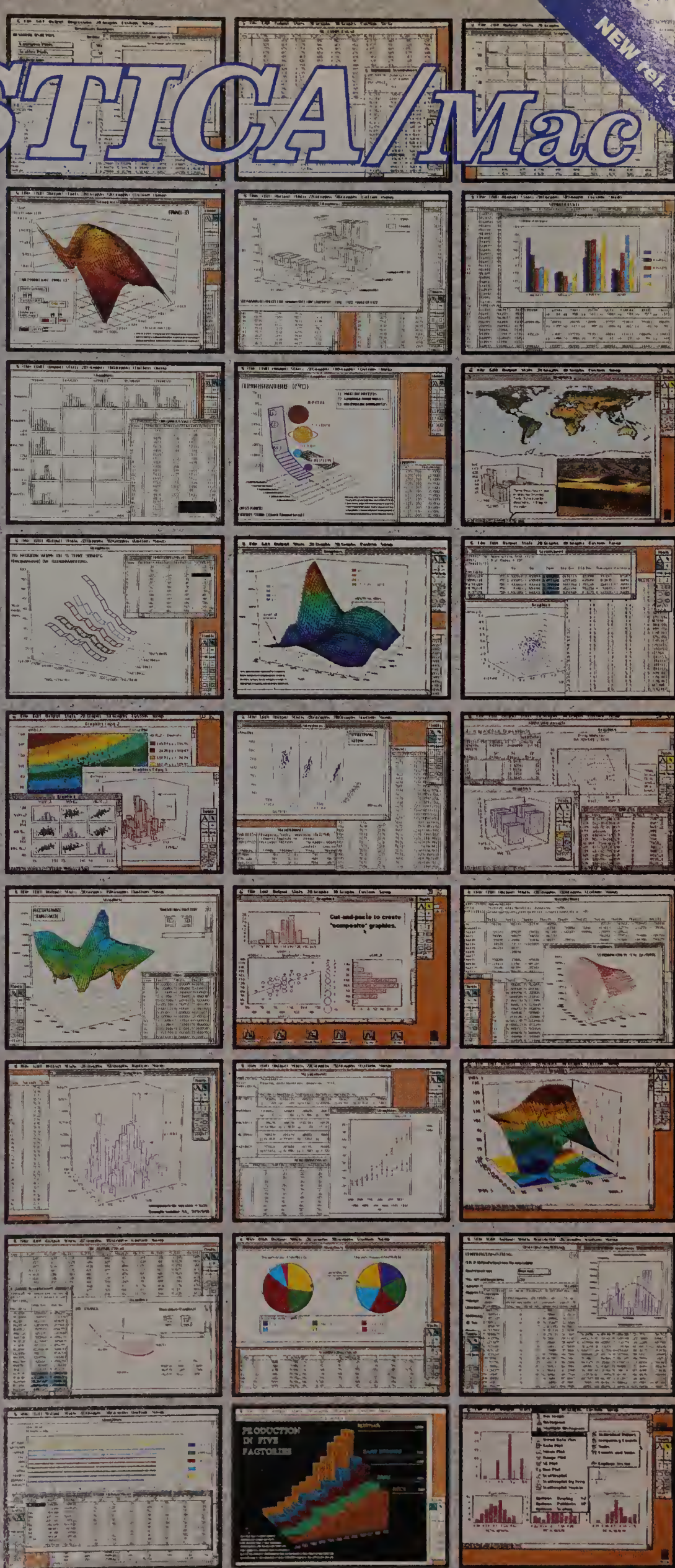
Domestic sh/h \$7 per product, please specify type of computer with order, 14-day money-back guarantee.

 **StatSoft™**

2325 E. 13th St. • Tulsa, OK 74104 • (918) 583-4149
Fax: (918) 583-4376

Overseas Offices: Statsoft of Europe (Hamburg, FRG), ph: 040/4200347, fax: 040/4911310; StatSoft UK (London, UK), ph: 0462/482822, fax: 0462/482855; StatSoft Pacific (Melbourne, Australia), ph: (03) 663 6580, fax: (03) 663 6117; StatSoft Canada-CCO (Ontario), ph: 416-849-0737, fax: 416-849-0918; Available From: CORPORATE SOFTWARE and other Authorized Representatives Worldwide: Holland: MAB Jelsing, 071-230410; France: Version US (1) 40590913; Sweden: AkademiData 018-240035; Hungary: P&D Soft KFT 185-6868; Belgium: TEXMA 10 61 16 28; South Africa: Osiris 12 663-4500; Japan: Three's Company, Inc. 03-3770-7600

CSS, StatSoft, STATISTICA/Mac, STATISTICA/DOS, and Scrollsheet are trademarks of StatSoft, Inc. Macintosh, Mac IIx, Excel and MacDraw are trademarks of their respective companies.





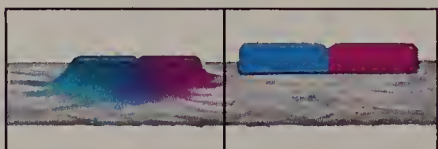
Claude Monet. *Japanese Bridge at Giverny*, 1900.

The image is priceless.

The clear superiority of solid ink technology is becoming legend.

Vibrant, precision color is finally here, and with JOLT™ it's also finally affordable.

Perhaps more surprising is that the image above is even better than this ad can show you,



Liquid ink bleeds, often causing unintended and inaccurate color. Solid ink does not.

because this magazine uses a liquid ink which bleeds when it hits the

paper. Solid ink holds its shape for noticeably better resolution.

Not only did Dataproducts pioneer the development of solid ink technology, our JOLT is also \$3000 less than the only other

color solid ink Adobe® PostScript® Level 2 printer on the market. It's the world's lowest priced color solid ink printer.

Even more impressive is JOLT's flexibility. Because of the non-dispersing nature of solid ink, it can not only print on plain paper, but on virtually any paper surface, giving you immense lati-



Fortunately, the printer isn't.

tude when creating documents, presentations, publications and color comps.

And because of its solid ink technology, JOLT prints more readable text, even at extremely small point sizes.

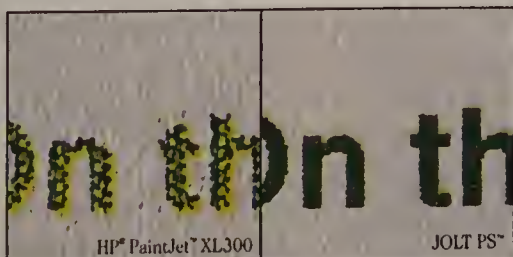
Finally, JOLT is also more

economical since it doesn't require any kind of special paper.

Imagine.

Now you can produce 16.7 million different hues with the precision and vibrancy of

solid ink technology, all at a remarkably low price.



Unlike liquid ink printers, JOLT creates crisp characters in solid, bold color (enlarged 250%).

So see your Dataproducts dealer today for a JOLT demonstration or call 1-800-334-3174 for more information.

Then stop by and check out JOLT, because when it comes to color printing, seeing is believing.

Dataproducts®
The high performance printer people.™

Dataproducts tagline are trademarks of Dataproducts Corporation. All rights reserved. Adobe and PostScript are registered trademarks of Adobe Systems, Inc. Collection, 1933.441. Chicago Art Institute. All rights reserved. HP and PaintJet are registered trademarks of Hewlett Packard.

Circle 38 on reader service card

NEW NORTON UTILITIES. GREATER THAN THE SUM OF ITS PARTS.

More than simply combining SUM and the Norton Utilities, we made it faster, more powerful, and easier to use.

Talk about a win-win proposition. Now you can get the most comprehensive data protection and recovery features for the Mac in a single box. Plus, some innovations that make Norton Utilities 2.0 the very best way to protect your data.

The ultimate in data protection.

Using simple menus and icons, Norton Utilities 2.0 combines the technologies from SUM and Norton Utilities to guide you through the best and worst of computing times.



Now you can diagnose problems and restore data—with one product from the master of data recovery, Peter Norton.

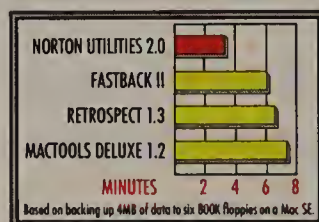
Say you've accidentally erased an important file, the enhanced UnErase® will dig deeper to recover it. The improved

To start, the Norton Disk Doctor® is in and it's more powerful than ever. It automatically diagnoses damaged hard drives and floppies, identifying and repairing both common and uncommon disk errors.

Volume Recover searches farther and wider to find lost or damaged data.

All this and fast backup, too.

Of course, the first line of defense against data loss is reliable backup. Our fast and flexible Norton Backup makes it easy. Use the scheduler to plan automatic backups from one or more volumes. Its data verification and error correction



Norton Backup lets you quickly and easily make backups of single files, folders or large volumes.

codes ensure the integrity of your files.

To make the most of your Mac's performance, check out Speed Disk™, the fast and safe way to defragment your files and optimize your hard drive.



Speed Disk™ accelerates your disk drive performance without risk.

Not just the best product, the best value.

The new Norton Utilities for Macintosh. It's everything you've come to expect from the top two Mac utilities. Plus, all the security, productivity, and system enhancements you'd expect from Peter Norton. In one box. Now what

could be greater than that? To upgrade your existing SUM II or Norton Utilities for Macintosh, or for the name of your nearest dealer, call 1-800-343-4714 ext. 754-G.



How Ehman Inc. Unraveled

BY DEBORAH BRANSCUM

EHMAN INC., A MACINTOSH peripherals company founded in 1985, hit on a winning strategy near the end of 1988 by introducing Mac owners to inexpensive hard drives. The Evanston, Wyoming, upstart became one of the fastest-growing businesses in the United States. Sales under the Ehman and Cutting Edge labels boomed to \$30-plus million in 1990. But despite the record numbers, Ehman Inc. didn't make a dime that year—it actually lost an estimated \$300,000.

The company's financial struggle ended in April 1992 when founder Michael Ehman shut the office. The company, which has not filed for bankruptcy, has an estimated \$4 million in debts (see *Conspicuous Consumer*, August 1992). A new company, called Bridgette, is now selling Ehman-labeled drives and monitors under Michael Ehman's direction from the San Diego suburb El Cajon.

How Michael Ehman made the transition from managing Ehman Inc. last year to managing Bridgette this year is a matter of intense interest in Wyoming. The state guaranteed a \$500,000 private bank loan to Ehman Inc. and also made a direct loan of \$50,000 to the company. Both loans were secured by Ehman Inc. inventory, and both loans are in default. The state of Wyoming will have to pay an Evanston bank the considerable difference between the value of the remaining inventory and \$500,000, and probably take a complete loss on the other \$50,000.

According to internal corporate documents and interviews with key sources, Ehman may have caused his company to violate the terms of his company's state-guaranteed loan by transferring inventory and business equipment from the old, failing enterprise to a new one unencumbered by debt. Ehman denies that he did anything wrong in moving from Ehman Inc. to Bridgette, a company he is working for as an unpaid consultant. A family member, he said, owns Bridgette.

Profile of an Entrepreneur

WHEN I ASKED MICHAEL EHMAN WHY his old company unraveled, he invoked bad sales forecasts, accounting problems, and a lack of controls. He said Ehman Inc.

didn't have access to seasoned executives and alluded to a power struggle with former company officials. He also mentioned a shortage of skilled workers, and his own lack of management skills. But when I asked former employees and associates of the executive why the company unraveled, they pointed to Michael Ehman.

Michael Ehman is a bright, talented salesperson who got in over his head, according to sources. Several large Ehman Inc. creditors said Ehman is an honest, stand-up guy. Former employees I spoke to admired his drive and commitment but said he is a lousy manager who is more comfortable with hardware than humans and who changes plans as often as he changes clothing.

Rapid growth has damaged many companies, including those with more-experienced managers. In fairness to Ehman, it shouldn't be surprising that he ran into problems with the company. Ehman was an entrepreneur, not a manager, and worked as a petroleum engineer before starting a Macintosh business out of his home.

But as Chrysler head Lee Iacocca is fond of saying, you need to lead, follow, or get out of the way. According to interviews with former employees and sources close to the company, Michael Ehman couldn't do any of those things well. He tried to lead, but couldn't stay focused on a single plan of action, pushing the company first in one direction, then another.

In February 1991, for example, Ehman founded Sterling Solutions, an off-brand hard drive company in Salt Lake City. Sterling had only two employees and sold drives made by Ehman Inc. Sterling was supposed to steal sales from other no-name companies and increase the overall sales volume. Instead, it flopped, and closed its doors after a few months.

Ehman couldn't follow, either, or get out of the way. Time and time again he hired people to save Ehman Inc., gave them responsibility, grew disillusioned with their work, felt betrayed, and then de-

nounced them. Sometimes he had good reason to feel betrayed, but not always, sources said. "I picked the wrong people," said Michael Ehman. "I continually staffed the company with people who were not ready for the job from an experience and ability standpoint. I had some real talented people, but they didn't have the background yet . . . That was my biggest shortcoming—I didn't build a good team."

According to former employees, and Michael Ehman himself, the company had few controls to speak of. Tales abound of confusion, misinformation, and waste. Of customers who paid for one monitor but received two. Of accounting failures, inventory problems, and tracking issues. "We had a sale at one point where we were actually losing money on the product, which we didn't know, because of incorrect cost estimations," said Peri Vastardis, a former salesperson for Ehman Inc. "Every unit we sold—and we sold 400 to 500 of these things—we were losing money on."

Associates paint the picture of a chaotic company generally without consistent plans, controls, or profits. And they describe a man in charge who resisted paying suppliers and often acted impulsively. "Michael Ehman is his own worst enemy," said Dave Watson, a former associate.



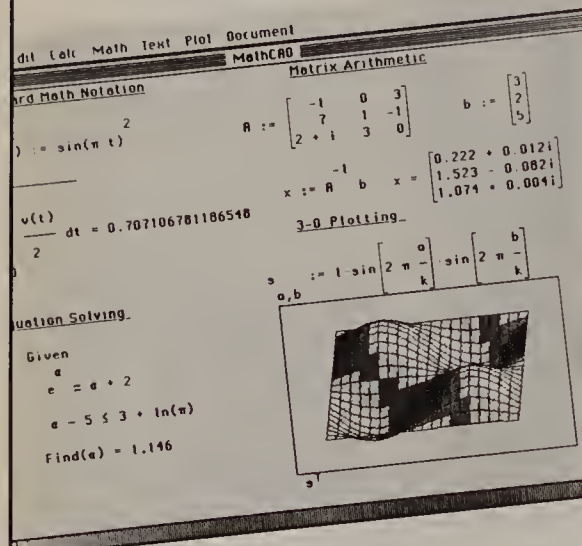
*Without
controls or profits,
the company
was in trouble.
Was Bridgette a
way out?*

Bridgette's Birth

EHMAN INC. HAD A HISTORY of financial ups and downs even before it began selling hard drives, but its most serious troubles began in early 1991, when the company lost a \$1.1 million credit line provided by a financial services company. Several months later the state of Wyoming stepped in with the \$500,000 loan guarantee for operating costs, but the loan was too little, too late, according to Michael Ehman. Although company officials were optimistic about Ehman Inc. in October 1991 (see *Conspicuous Consumer*, February 1992), their enthusiasm soon faded. By December

continues

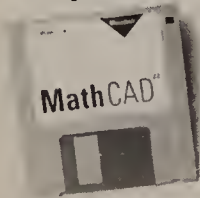
Technical calculations made easy!



Perform engineering and scientific calculations faster... and with fewer errors.

- **Mathcad 2.0 does your numerical analyses quickly, easily... and inexpensively!** The live document interface™ lets you integrate equations, text, and graphics on your computer screen. You can see what you solve and update your equations and graphs with a single keystroke.
- **You do the thinking while Mathcad does the work.** Mathcad picks up where calculators and spreadsheets leave off. With over 120 commonly-used functions built-in, Mathcad can handle your formulas, exponentials, differentials, cubic splines, FFTs, and matrices.
- **Applications Packs customize Mathcad to your work.** Ten different packs are available for electrical, mechanical, civil, and chemical engineering, and other technical applications.
- **Mathcad works on your Macintosh, PC, or UNIX workstation.** More than 120,000 engineers, scientists, and educators are already using Mathcad to turn their computers into powerful workstations that can handle virtually any technical application.

Call 800-MATHCAD to request a free demo disk!



In Massachusetts, call 617-577-1017.

For a free Mathcad Introductory Kit, clip this coupon and mail it back to us, or fax it to 617-577-8829. Or circle your reader service card.

☐ **Yes! Tell me more about Mathcad 2.0!**

Name

Title

Company

Address

City State Zip

Phone ()

MathSoft
2 + √ = × ÷ f + δ

MathSoft, Inc.
201 Broadway
Cambridge, MA 02139
USA

MW-10

MCTECH 2.0

Circle 34 on reader service card.

1991, sales had dropped so dramatically that, Ehman said, he began trying to sell the company.

The next month, in January 1992,

FREE OVERNIGHT DELIVERY!

"I Make Hard Drives Reliable On The Inside Because My Name Goes On The Outside."

I take extra pride in every drive that leaves our shipping dock because it carries the Ehman name. And because of that extra dedication, what started in my garage six years ago, has mushroomed into the largest third party producer of Macintosh mass storage.

Today I honestly believe no one makes a better hard drive than Ehman. Our newest E series products have all the "beats and whistles" of drives costing several hundred dollars more. Features like two extra power outlets for single, dual, system backup and dual fuse circuitry are added protection in the event of an electrical surge.

Ehman drives are fast and quiet, but it's our commitment to your total satisfaction that separates us from the pack. All our drives come with a 30 day money-back guarantee and a two year limited warranty, as well as our own personal commitment to giving Ehman customers the best. If you're not happy with an Ehman drive I want to hear from you and I'll make it right!

After all, it's not just a hard drive you're getting... it's an Ehman.

Ehman
Quality Macintosh Peripherals Since 1985

Circle 144 on reader service card

"Basically what you had was a failure of one of the largest companies in the industry without it hurting the customers," said Michael Ehman about the transition from Ehman Inc., the company advertised above, to Bridgette Inc. He said Bridgette will focus on improving technical service and support for its own products and those of other companies.

Ehman Inc.'s chief financial officer, Dan Ollar, drew up Nevada incorporation papers for a new company to be called Phoenix, a fitting name for what Michael Ehman must have hoped would be his company's rebirth. When that name was unavailable, Ehman told Ollar to use the name Bridgette, in honor of his daughter, born at the beginning of the year.

Also in January, Michael Ehman met with Cliff Wildes, president and founder of a competing peripherals company called Microtech International, to discuss whether Microtech would be willing to manufacture drives for Ehman Inc. At the same meeting, Ehman asked Wildes if he would be interested in funding a new company, should Ehman start one. Wildes said no to both deals. Undeterred, Ehman continued looking for capital through early spring. But, according to Ehman, none of the potential investors he spoke to wanted to assume Ehman Inc.'s debts or stay in Wyoming, as required by the terms of the state-guaranteed loan.

Without investors or significant sales, Michael Ehman shifted to another plan. By March 1992, Bridgette's incorporation papers had been accepted and filed. In mid-April the few remaining Ehman employees were laid off, and by April 23 the Ehman Inc. 800 telephone number was ringing in Bridgette's new office in San

Clemente, California. There Michael Ehman managed the new company in office space rented from Questronex, the independent supplier that had built hard drives for Ehman Inc. and was now providing them to Bridgette.

Investing in Monitors

IN EARLY MARCH 1992, ACCORDING TO a source close to Ehman Inc., Michael Ehman outlined an ambitious plan of action that involved all the companies he managed. One provision was finding investors to assume Ehman Inc.'s debts. Other provisions of the plan included a loan from Wyoming Software to Bridgette. With that money, Bridgette was to buy monitors from Ehman Inc. and then resell them to Bridgette's own customers, according to the source.

As mentioned earlier, Ehman said he couldn't locate investors willing to assume Ehman Inc.'s debt. But on March 13, 1992, he forged ahead with at least part of the plan by obtaining a \$35,000 cashier's check from Wyoming Software, another company he managed (see "What about Business Sense?"). The check was made out to Ehman Inc., according to former Wyoming Software executive Jim Acton, who said Michael Ehman made it clear to him that the money was intended for Bridgette. Acton said he saw a promissory note that outlined terms for Bridgette to repay the loan, and a consulting agree-

Tales abound of confusion, misinformation, and waste. Of accounting failures and tracking issues.

ment that required Wyoming Software to pay Bridgette \$2000 per month for consulting services, whether or not consulting actually took place.

The \$35,000 went to one of Ehman Inc.'s creditors. Display Technologies of Elgin, Illinois, built monitors for Ehman Inc., invoiced the company, and then held the monitors for Ehman Inc. until they were shipped to customers at Ehman's request. By March, Ehman Inc. owed the supplier a considerable amount, and Display Technologies was threatening to stop

continues

We Have Connections

The Competition

\$59⁹⁵

\$39.50 in Ten Packs
\$31.90 in Fifty Packs

Guaranteed 100% compatible with AppleTalk & PhoneNet—because every TurboNet ST is Manufactured under Patent License from Farallon Computing, Inc.

The Focus TurboNet ST™

\$14⁹⁹

\$11.99 in Ten Packs
\$ 9.99 in Fifty Packs

Expensive

Black!

This is a 'plug-in' terminator. Leave these off (or on) in the wrong places, and your network doesn't work.

The TurboNet ST uses a remarkable new Distributed Signal Dependent Damping™ technology that automatically absorbs reflected signal and keeps the work out of maintaining your network.

*Suggested Retail Price
all prices verified on 6/24/92

LED activity lights show you network signal activity—invaluable when determining which node is receiving or transmitting signals to the network. Only TurboNet ST has this feature—if you ever have to trace a dead node, you'll appreciate activity lights forevermore.

Save even more with 10 Packs & 50 Packs!

10 Pack **\$119⁹⁹**
Farallon's PhoneNet price—\$395.00*

50 Pack **\$499⁹⁹**
Farallon's PhoneNet price—\$1,595.00*

How do we sell products at these low prices? Manufacture it and sell it Direct to the customer.

You save \$40 or more on every TurboNet ST—because we took the middlemen out of the loop

TurboNet ST allows you to use ordinary phone wiring to connect your Macintoshes, printers and peripherals together. It's the smart buyers alternative to Apple and Farallon's expensive connectors.

Only TurboNet ST has all of these features:

- LED activity lights
- Self terminating
- PhoneNet & AppleTalk compatible
- Lifetime Warranty

Anyone who has experienced the task of troubleshooting an AppleTalk network and tried to determine which node was sending or receiving data on the network can tell you: *You can't see where network activity stops without LED lights!* And only TurboNetST has activity lights.

The Best Value

Features	TurboNet ST	PhoneNet
LED Activity lights	✓	
Self-Terminating	✓	
Lifetime warranty	✓	✓
For all Macs	✓	✓
CoolBlack Color	✓	
Under \$15	✓	
Surge protection	✓	✓
30-day Money Back	✓	
Satisfaction Guarantee	✓	*

*Policy varies with individual retailers

Our unique self-terminating feature means you won't ever have to troubleshoot termination problems with a network that uses TurboNet ST's. It's that simple. And termination is something we can all do without these days.

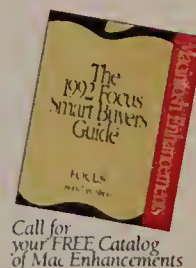
100% compatibility with all Macs & PhoneNet connectors is guaranteed by Focus. And if any TurboNet ST ever fails, we will replace it with our lifetime product warranty.

So stop wasting your time and money with overpriced PhoneNet connectors—order TurboNet ST today.

800-538-8866

Call toll free to order now
Inquiries welcomed • From Resellers, VARs, and Systems Integrators

FOCUS
Quality, Service, Support & Value



Call for your FREE Catalog of Mac Enhancements

How to Order: Our Customer Advisors will help you Monday thru Friday 9am to 8pm Eastern Time. We accept VISA, MasterCard, American Express, Discover, Fortune 500 PO's, Government and University PO's (approved), business and personal checks (with check approval), Cashiers checks, Money Orders, and COD. • Focus Enhancements, Inc. 800 West Cummings Park, Woburn, MA. 01801 • 617-938-8088, fax 938-7741

© 1992 Focus Enhancements, Inc. All rights reserved. Focus, TurboNet ST, "The Focus Smart Buyers Guide" are registered trademarks of Focus Enhancements, Inc. PhoneNet is a registered trademark of Farallon Computing, Inc. Farallon suggested retail prices verified on 6/24/92. Macintosh, LaserWriter, AppleTalk, and LocalTalk are registered trademarks of Apple Computer, Inc. Manufactured under Patent License from Farallon Computing, Inc. All prices and items subject to change and availability.

Circle 89 on reader service card

Photoshop™ 5x Faster for only \$49.95 Limited Time Offer

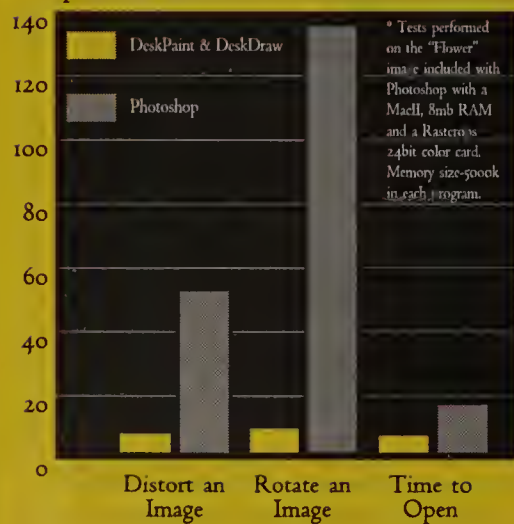
DeskPaint offers graphic editing that is up to five times faster than Photoshop at a fraction of the cost! Best of all, it works as well on a B&W Classic as it does on a Quadra with 24bit color.

Hewlett Packard loves DeskPaint so much, it's bundled with every HP ScanJet for the Macintosh. And as an added bonus, DeskPaint comes with DeskDraw, a full-featured drawing program.

So, if you own Photoshop, don't waste any more time! Take advantage of this special offer to get DeskPaint & DeskDraw at a 1/4 of its' \$200 retail price.

\$\$\$1/2 MacUser, November 1990

Speed in Seconds



To order call Zedcor toll free at:

1.800.482.4567

or complete the coupon below and fax to 602.881.1841



DeskPaint & DeskDraw and ZEDCOR are trademarks of Zedcor, Inc. Photoshop is a trademark of Adobe Systems, Inc.

What about Business Sense?

Recently readers have written with questions about Business Sense. Some users may be wondering what has happened to the product, which company is publishing it now, and what an accounting program has to do with Ehman Inc. Here's an update.

Business Sense began life as an accounting package called Turbo Maccountant, which *Macworld* reviewed in October 1986. Digital Etc., the small company that developed it, sold the rights to Monogram Software, which marketed the product as Business Sense in 1987. A few years later, Digital Etc. reacquired the rights to the program and then licensed them to a new company in June 1990. That company was called Inman Software and was started by Michael Ehman and two consultants to Ehman Inc.

According to interviews and legal documents, the Inman partnership dissolved in April 1991 after the two other principles lost a power struggle with Michael Ehman over the course of Ehman Inc. He became sole owner of Inman, which shut down. A new company, which used the same employees, emerged in August 1991. It was called Wyoming Software Corporation. As Michael Ehman explained it to me at the time, "Some California investors bought licensing rights to Business Sense . . . I do not have an equity position in Wyoming Software, although I have been retained as a consultant." According to interviews and company documents, Ehman managed the company as president. The California investors were apparently one person, Ehman's mother.

Ted Wood, a former Ehman Inc. employee who started working at Wyoming Software, badly wanted the rights to Business Sense for himself. So he negotiated an agreement with Michael Ehman in September 1991 to buy the outstanding shares of Wyoming Software Corporation from Ehman's mother. Wood claimed he made monthly payments faithfully. But he was unable to make two balloon payments. On January 30, 1992, Ehman regained control of the company when he went to the Wyoming Software office in Evanston, Wyoming, with a sheriff and had the locks changed, at least nominally on behalf of his mother.

According to former executive Jim Acton, Wyoming Software wanted to broaden its user base, so the company made an upgrade deal with Software Toolworks, which publishes Dollars & Sense. Wyoming Software paid Software Toolworks for the right to notify Dollars & Sense users of a recent upgrade and sell them the upgrade plus a free copy of Business Sense 1.5.

The mailing in early February 1992 was fairly successful in terms of responses, but there was a hitch. Digital Etc. indirectly halted shipment of the completed Business Sense version 1.5 because of allegations involving unpaid royalties. As a result, Wyoming Software was forced to send users Business Sense 1.4.1, which had fewer features than the version they paid for. (Version 1.5 solved a low-level printing problem and, for the first time, allowed data to be imported into the program, according to Acton.) The company did promise users who bought the Dollars & Sense upgrade package a free upgrade to Business Sense 1.5; it's not clear whether everyone who requested the upgrade got one.

The dispute between Wyoming Software and Digital Etc. was resolved when the principals signed legal documents in April 1992 that amounted to a peace treaty between them. At the same time, Michael Ehman left the company in the hands of Jim Acton. There are differing accounts of what happened next. Acton said he resigned from the company in April. Ehman said Acton agreed to take over Wyoming Software and didn't follow through on the deal.

In any case, Wyoming Software was essentially dissolved. On May 7, 1992, Jim Acton sent a letter to Michael Ehman about the company that reads in part, "I am returning your proposal unsigned. What little was left has been either repossessed by unpaid vendors, used to pay payroll, returned to Ehman headquarters, or blown off."

Jim Acton and Ted Wood have licensed the marketing rights to Business Sense from Digital Etc. and started a new company, called Business Sense Inc. (307/877-2231 or 800/377-4954), to distribute it. Acton is in charge of technical support and oversees the small Kemmerer, Wyoming, office, while Wood manages sales from West Jordan, Utah. Version 1.6 of Business Sense is out and includes a new check-reconciliation function and improved import and export features, according to Acton. The company is working to resolve any consumer problems that may have arisen in the transition from Wyoming Software to Business Sense Inc., Wood said.

releasing products if payment wasn't forthcoming, according to Ollar. So at Michael Ehman's request, Ollar sent Display Technologies a payment of some \$40,000 shortly after the \$35,000 check from Wyoming Software was deposited into the Ehman Inc. bank account.

A few days later, around March 16,

Ehman Inc. instructed Display Technologies to ship 264 monitors and 264 graphics boards from Ehman Inc. inventory to a customer in California. The order, which covered about half of Ehman's total inventory, was unusual because the monitors were being sold for less than

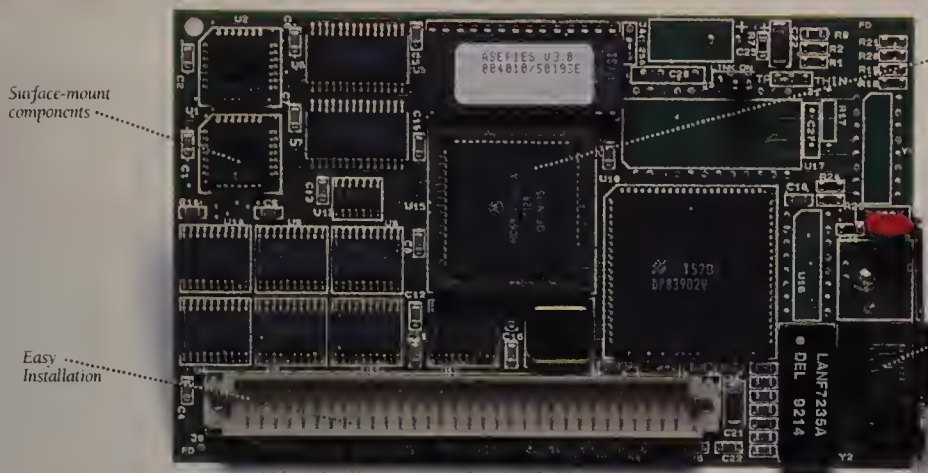
continues

Name _____
 Address _____
 City _____ State _____ Zip _____
 Phone _____
 Credit Card# _____ Exp. Date _____
 Circle One - VISA MasterCard AmEx
 Photoshop Serial # _____

Include \$8 shipping & handling in the U.S., \$10 Canada, \$20 other, Arizona residents add \$3.50 tax.

Circle 161 on reader service card

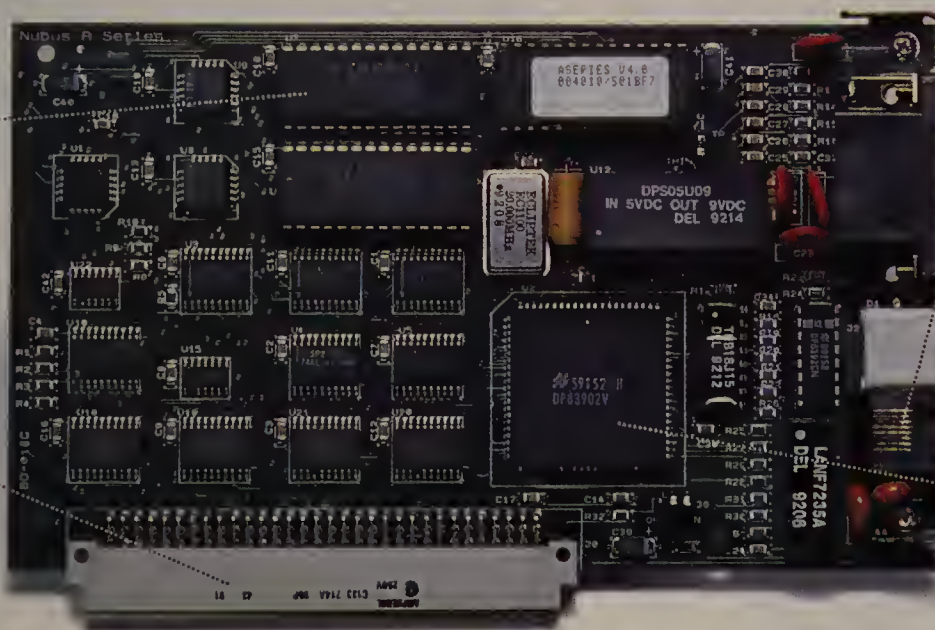
EtherLAN™



\$139⁹⁹
thin or 10BaseT,
FPU socket, 16K RAM

EtherLAN™ LC-T
Product # 60 3100

Available with
Thin or 10BaseT
2-way available:
(thin + 10BaseT)



\$169⁹⁹
NuBus with 64K RAM
Thick, Thin, and 10BaseT

EtherLAN™ AI-II
Product # 60 3600

Highly integrated
ST-NIC™ chip
from National
Semiconductor

Make the right choice with 3-in-1 boards

**Thick, Thin, and 10BaseT—
tomorrow's topology needs
require flexible solutions.**

When you make the decision to invest in Ethernet, invest in the best technology for the job. Our new 3-way EtherLAN boards give you the advantage of instantly changing to the topology of choice—whether it's thick, thin, or 10BaseT.

- **30-Day 'Love It or Return It' Guarantee**
- **FPU sockets for expandability**
- **3-way boards: Thick, Thin, and 10BaseT**
- **Lifetime Product Warranty**
- **Pass-Thru Slot boards for SE/30 and IIsi**

EtherLAN is the smart buyers alternative to expensive Ethernet cards. And this is state-of-the-art Ethernet, with features found only on the best boards. Compare with Asanté and Farallon—we have the best value.

The Best Value

Ethernet Board	EtherLAN	Asanté	Savings
SE/30, IIsi ***	\$149.99	\$249	\$ 99
Mac II (NuBus)***	\$149.99	\$249	\$ 99
Mac II 3-way *	\$169.99	\$329	\$ 159
IIsi Pass Thru**	\$189.99	\$329	\$ 139
LCT/FPU 10BaseT	\$209.99	\$399	\$ 189
LC 2-way, FPU, 64K	\$229.99	\$479	\$ 249
EtherLAN SC(SCSI)	\$249.99	\$399	\$ 149
EtherLAN HUB 8	\$249.99	\$399	\$ 149

* Thick, Thin, & 10BaseT— all on one board
** Pass Thru Slot—allows second PDS board
*** 16K, Thick and Thin OR Thick and 10BaseT

**24 Quality Ethernet
Solutions to choose from**

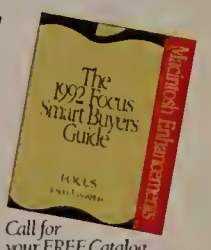
Focus EtherLAN SC provides Ethernet through your SCSI port. Fully compatible with Thick, Thin, or 10BaseT, the EtherLAN SC is a convenient plug and play solution for all Macs. **Only \$249.99**

Focus EtherLAN 8-Port HUB for 10BaseT with Thin connector, now available. **Only \$249.99**
Stop wasting your time and money with overpriced Ethernet cards—order your EtherLAN today.

800.538.8866

Call toll free to order now

FOCUS
Quality, Service, Support & Value



Call for
your FREE Catalog

How to Order: Our Customer Advisors will help you Monday thru Friday 9am to 8pm Eastern Time. We accept VISA, MasterCard, American Express, Discover, Fortune 500 PO's, Government and University PO's (approved), business and personal checks (with check approval), Cashiers checks, Money Orders, and COD. • Focus Enhancements, Inc. 800 West Cummings Park, Woburn, MA. 01801 • 617-938-8088, fax 938-7741

© 1992 Focus Enhancements, Inc. All rights reserved. Focus, EtherLAN, EtherLAN LC, EtherLAN AI-II, EtherLAN SC, "The Focus Smart Buyers Guide," are registered trademarks of Focus Enhancements, Inc. All prices and items subject to change and availability

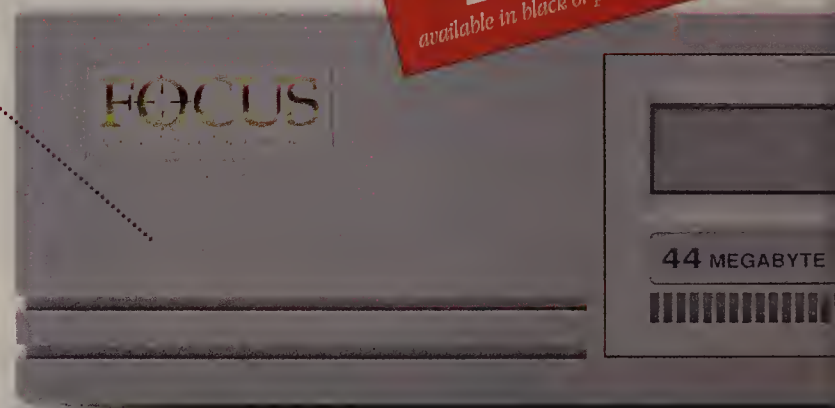
It's removable, expandable Backupable, lockable

**44 & 88
Cartridge Drives**

Unlimited Capability is yours - just add more 44mb or 88mb cartridges as you need more disk space. The innovative 44mb/88mb Duet Cartridge Drive allows use of both size cartridges for complete compatibility and flexibility with others.



SyQuest cartridges have become a standard format for Macintosh service bureaus - the tool of choice for businesses that transfer files that are too large for the Mac's standard 1.4 mb floppy disk, and too large to modem easily.



\$479⁹⁹
available in black or platinum

This is an Eddy Award - MacUsers annual Editors Choice Award for Best Hardware Product of the Year to SyQuest Technologies - the maker of the R44 and R88 removable mechanism that is the heart of every Focus Drive.

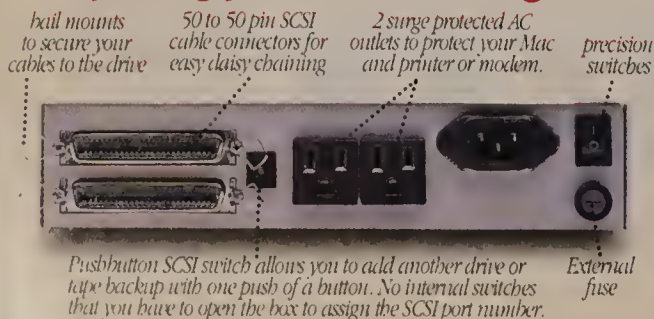


Imagine 88 Megabytes on a removable cartridge with 20ms 'hard disk speed'

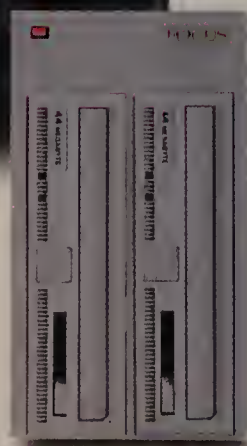
No more fumbling with multiple floppies, or lugging hard drives and Macs around. Inside every Focus Removable Cartridge is an actual hard disk operating at 20ms.

Order your removable drive now & try it for 30 days. If you're not 100% satisfied, return it for a full money-back refund.

**These are no stripped-down drives!
Everything you need to Plug & Play**



ball mounts to secure your cables to the drive
50 to 50 pin SCSI cable connectors for easy daisy chaining
2 surge protected AC outlets to protect your Mac and printer or modem.
precision switches
Pushbutton SCSI switch allows you to add another drive or tape backup with one push of a button. No internal switches that you have to open the box to assign the SCSI port number.
External fuse



44/44MB Duet Vertical

\$899⁹⁹

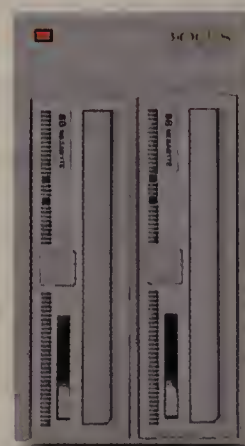
available in black or platinum



44/88MB Duet Vertical

\$999⁹⁹

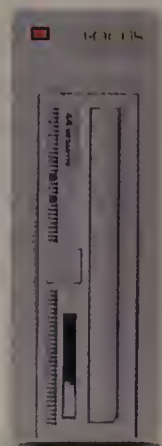
available in black or platinum



88/88MB Duet Vertical

\$1199⁹⁹

available in black or platinum



44MB Vertical

\$479⁹⁹

available in black or platinum

le, reliable, transportable, e, and wicked fast!

20 millisecond 'hard disk speed' - inside is an actual hard disk, just like the one inside your fixed drive, only encased inside a durable protective shell. With thousands of these removable cartridges in use every day, this media has the reliability that you demand.

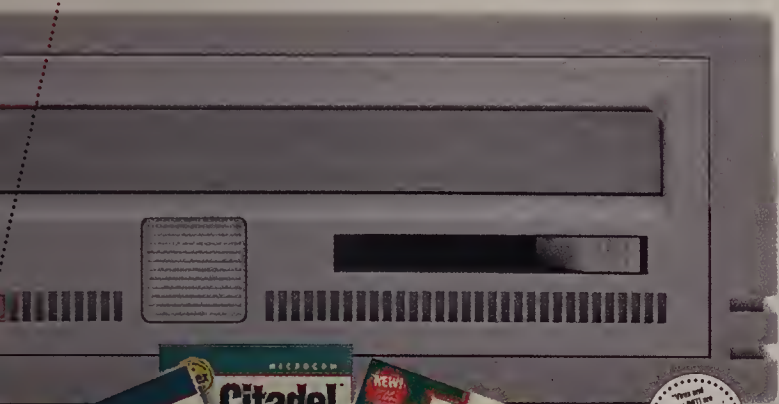
THE BEST PRICES ON REMOVABLE DISKS

Factory formatted and fully tested
for Plug & Play performance.

\$61⁹⁹ 44MB CARTRIDGE
Three Pak \$179.99

\$99⁹⁹ 88MB
3 Pak \$289.99

Every removable cartridge is Preformatted
and 100% Tested for instant performance.
When you buy unformatted disks from other sources,
you must perform a tedious formatting procedure
before you can use their disks. This takes time - as
much as fifteen minutes per disk to format,
once you're set up. We test each disk
and format the media for you.
So you can get to work fast.



"Virex and (Virex INIT)
are excellent performers"
- MacUser



"Citadels utilities are
extremely easy to use
and appear to cover all
the bases" - MACWORLD

FREE \$300 OF SOFTWARE!

FREE with every drive- an unbeatable
selection of values at no additional price!

Award winning software: Virex, Citadel, and
Complete Undelete, 10MB Shareware, a full 3-Year
Warranty, and 30-day Moneyback Satisfaction Guarantee.

We sell only Direct to you, without the added retail markup,
Saving you 40%-70% everyday. Call now to order



800-538-8866

Focus Customer Advisors are here to provide product information
and take your orders Monday through Friday 9am-8pm EST

©1992 Focus Enhancements, Inc. All rights reserved. Focus and 'The Focus Smart Buyers Guide' are registered trademarks of Focus Enhancements, Inc. 'Love It or Return It' is a registered slogan mark of Focus Enhancements, Inc. Ultracolor, Virex, Complete Undelete, and Citadel are trademarks of Ultracolor Systems, Inc. Macintosh is a registered trademark of Apple Computer, Inc. All other product names or brand names are trademarks of their respective holders. All prices and items are subject to change and availability.



88MB Vertical

\$599⁹⁹

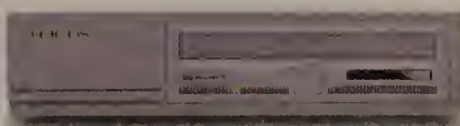
available in black or platinum



44 MB Zero Footprint

\$479⁹⁹

available in black or platinum



88MB Zero Footprint

\$599⁹⁹

available in black or platinum



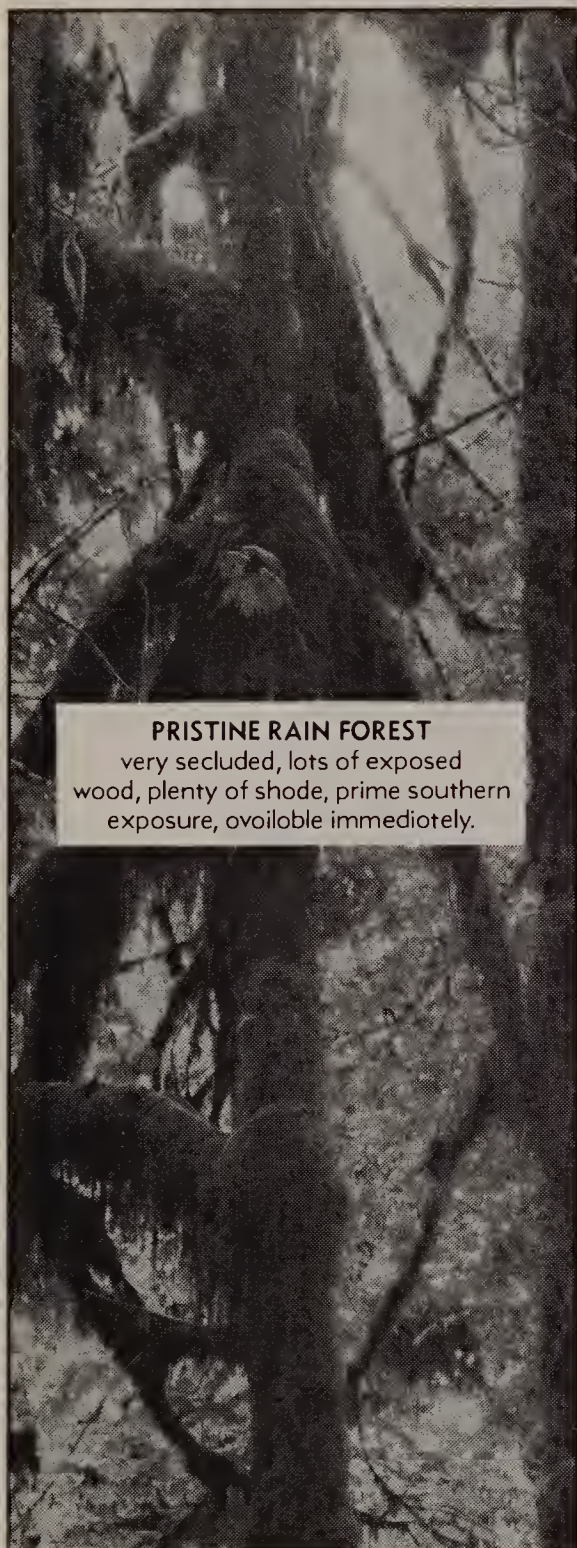
Call for
our new
Product
Catalog
-it's free.

FOCUS
Quality, Service, Support & Value

800 West Cummings Park, Suite 4500 Woburn, MA 01801
phone 617.938.8088 fax 617.938.7741

Inquiries welcomed from Resellers, VARs, Systems Integrators.

Circle 91 on reader service card



PRISTINE RAIN FOREST

very secluded, lots of exposed wood, plenty of shade, prime southern exposure, available immediately.

© Dovid Muench 1991

Prime Real Estate. For years, The Nature Conservancy has purchased large tracts of it so that endangered species can flourish there. Now, as partners in the public television series *Nature*, we're helping provide another place where wildlife can flourish. To learn more about these and all of our activities, call 1-800-628-6860.

NATURE &

The
Nature
Conservancy

Nature appears Sundays
on PBS

what they cost Ehman Inc., according to Ollar. Display Technologies didn't have any graphics boards but shipped 264 cartons of monitors to San Clemente, Cali-



KEVORK DJANSEZIAN

John Cox followed Ehman to Bridgette and left, disenchanted, after a short time. "I don't think Mike Ehman should be allowed to own or operate a business until he learns to take care of his employees, his vendors, and his customers," said Cox.

fornia—Bridgette's future home—on March 30. It was a neat trick—\$35,000 from Wyoming Software mingled with \$5000 from Ehman Inc. and then arrived at Display Technologies as partial payment on the existing Ehman Inc. inventory. Shortly afterward, Ehman instructed that part of that inventory—worth about \$150,000 if sold at retail prices—be shipped to his new company, Bridgette.

The problem with the transfer, according to sources, is that by March 16 Michael Ehman was working to leave Wyoming so he could open Bridgette in California. Ehman Inc. would soon close its doors. And in that case, all of Ehman Inc.'s inventory belonged to the private Evanston bank that had loaned Ehman \$500,000 and to the state, which had guaranteed the unpaid loan.

Ehman denies that any transfer of assets took place between Ehman and Bridgette, and he denies that the state of Wyoming had any legal claim on the monitors at all. In fact, he said, Wyoming is in better shape now as a result of the monitor purchase by Bridgette because Bridgette must repay Ehman—and thus, the state—for the purchase. (That logic ignores the money Display Technologies lost on the deal by never receiving full payment for the monitors, assuming the state didn't actually have rights to Ehman's inventory. And if the state did have rights to the inventory, as sources claim, that argument overlooks the below-cost sales terms that the state of Wyoming might have been able to better if it retained the inventory itself.)

John Cox remembers the monitors well—he called them "Bridgette's funding source." No profits could be expected

from hard drive sales, because Questronex had agreed to supply products to Bridgette only if *all* the profits from drives went toward the debt Ehman Inc. had run up with that company. So selling monitors may have been the only way Bridgette could have been funded, although Ehman denies that was the case.

Another theory, suggested by a source close to the company, is that Ehman was trying to protect a family member's investment of close to \$20,000 in Bridgette. The funds, which were intended for Bridgette—a company that didn't exist at the time—were deposited in Ehman Inc.'s bank account in January and went to pay for advertising. That made the family member an unsecured Ehman Inc. creditor, according to the source. But as Michael Ehman explained it to me, Bridgette actually funded Ehman Inc. by providing the company with needed funds, and it was only reasonable for the investor to protect his investment by buying discounted inventory in return. (Inventory that was worth, remember, about \$150,000 if sold at retail prices.)

The Comeback Kid?

LATE LAST SPRING, MICHAEL EHMAN sent overdue commissions to some former Ehman sales people and repaid some local businesses that had been burned when Ehman Inc. closed its doors. Questronex is no longer building hard drives for Bridgette, which moved to El Cajon, California, where it continues to sell products via Ehman Inc.'s former 800 line. In June, Bridgette employees worked to repair and return drives under warranty to Ehman customers, said former Bridgette consultant Randy Carter. And in the last week of July, Bridgette ran an ad in *MacWeek* for an inexpensive two-page monochrome monitor and 120MB hard drive.

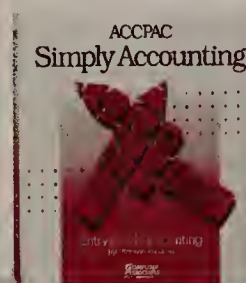
According to Ehman, Bridgette is spending \$5000 a month on telephone bills to support old Ehman Inc. customers. And at press time *Macworld* has received about five complaints from Ehman and Bridgette customers, far fewer than the number we received from Jasmine customers when that company closed. Ehman said he should be judged on his actions the past several months and reiterated his concern for his customers. Will Michael Ehman be the comeback kid? Let me know what you think. **m**

Research assistance by CAROLYN BICKFORD.

Send nominees for sainthood to Service Heroes, *Macworld*, 501 Second St., San Francisco, CA 94107, or via AppleLink (Macworld1) or America Online (Branscum). Conversely, drop *Conspicuous Consumer* a line if a company is ignoring you.

Some People Are Born Accountants. For The Rest Of Us, There's New ACCPAC Simply Accounting.

Easy To Learn, Easy To Use And Only \$199.



Now there's an accounting program anybody can use—new ACCPAC® Simply Accounting™, the quickest and easi-

est way to take care of your books.

You'll have it up and running in minutes. And you can do anything with just a few clicks of the mouse. Write a check. Print out an invoice. Do your payroll. Manage your receivables.

What used to take hours now takes just minutes. So you can spend less time counting your money—and more time making it.

And since it costs only \$199, you can take care of your books without breaking the bank.

Call us today at 1-800-CALL CAI for the location of your nearest dealer.

It's the accounting program anybody can use.

And we mean anybody.



For Only \$199 You'll Get: • General Ledger • Accounts Payable • Accounts Receivable • Payroll • Inventory Control • Job Costing • Prints Checks, Statements, Invoices and Mailing Labels • Produces Standard Accounting Reports • Quick Set-Up

© Computer Associates International, Inc., One Computer Associates Plaza, Islandia, NY 11788-7000. All product names referenced herein are the trademarks of their respective companies.

Circle 82 on reader service card

1-800-248-0800 • ORDER SATURDAY—RECEIVE MONDAY!



- ✓ Over 2400 Products
- ✓ Latest Releases
- ✓ Hassle-free Ordering
- ✓ Open 24 Hours Every Day
- ✓ Lowest Prices
- ✓ Top-Rated Sales Advisors
- ✓ Quality Products
- ✓ \$3 Overnight Shipping

NOW WE SPEAK YOUR language

- Wir sprechen Deutsch
- Vi snakker Norsk, Svensk og Dansk
- Hablamos Español
- 日本語でどうぞ
- On parle Français
- 저희는 한국말을 사용합니다

Outside USA & Canada call 1-206-883-3088

Aldus PageMaker 4.2



\$494



This is it. The one and only PageMaker desktop publishing powerhouse from Aldus. The new System 7 Savvy version 4.2 is packed full of enhancements and features. There's a control palette for precise numeric placement and scaling of objects, a new user-interruptible screen redraw, baseline-to-baseline leading, page sizes up to 42"x42" and much more. And 4.2 now comes FREE with Aldus PrePrint, the color separations software that's easy to use and compatible with all Aldus products. Aldus #04573 7 ✓



Aldus Pagemaker w/Animals..

534

Increase the processing speed of your Quadra by up to three times with the Animals cache management system. This value-priced Quadra cache control gives you copyback and write-through caching for '040 incompatible applications via transparent management of cache modes. Impulse Technology #05589

Capitalist Pig \$34

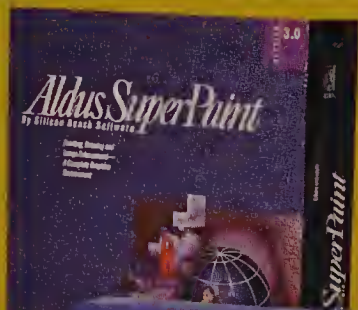


Battle for billions. You'll make crucial business decisions every minute and enjoy the results—or suffer the consequences. Packed with sound, animation and fun! Pluma Software #05607

Your Choice
\$124

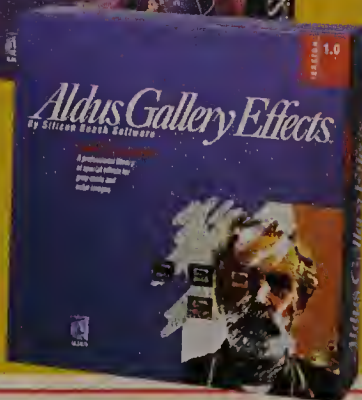
Aldus SuperPaint 3.0

New Aldus SuperPaint 3.0 is the complete painting, drawing and image enhancement package for the Mac. It includes 1- through 24-bit color, textures, gradients, masking, color balancing, AutoTrace, Beziers and EPS graphics support. Aldus #04190 7 ✓



Aldus Gallery Effects

Gallery Effects automatically turns grayscale and color bitmapped images into spectacular, breathtaking art. 16 master effects including Graphic Pen, Watercolor, Charcoal and Emboss, with thousands of variations from each. Works directly within programs like SuperPaint, Photoshop and Painter, or as an application DA. Aldus #04121 7 ✓



Xerox AccuText

\$598



Why retype when you can quickly and easily scan printed documents into your Mac electronically. Unlike many other text recognition programs,

AccuText is capable of handling documents containing mixed type faces, graphics or multi-columns. It even handles degraded documents. It actually learns as it processes your document. When it encounters an unreadable character, AccuText continues to process the document, and returns to apply newly gained knowledge to the understanding of the character. Xerox #04994



Diva Video Shop \$398

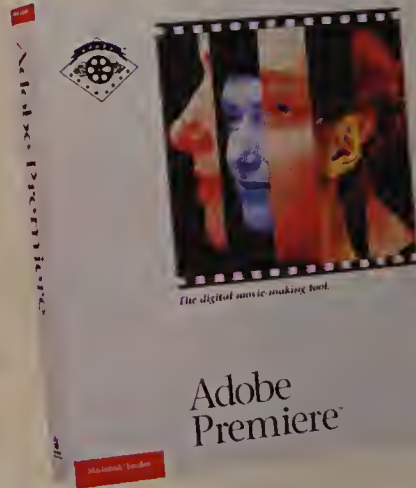
Create & edit sophisticated, attention-grabbing QuickTime movies with DiVA VideoShop. Use the recording module to capture video clips. Edit movies with copy-and-paste simplicity, then add effects, overlays, titles and up to 16 video tracks. Plus, you get a CD containing over 300 movies and sounds, FREE. DiVA #00602 7



Pro QuickTime Authoring Kit

\$998

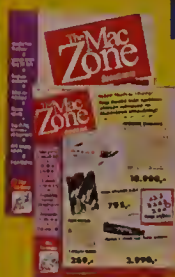
Save nearly \$1,000 off the individually-priced items with Macromedia's Professional QuickTime Authoring Kit! You get everything you need to start making, editing and playing QuickTime movies right away: Director 3.1, MacRecorder Sound System Pro and ClipMedia Volume 1. Macromedia #050187



Adobe Premiere

\$304

Produce attention-grabbing QuickTime video movies on your computer. Adobe Premiere is a simple yet powerful user interface for visually combining QuickTime video footage, audio recordings, animations, still images and graphics to create new QuickTime digital effects. Utilizes plug-in filters, including those for Photoshop. Adobe #04670 7 ✓



LIVING IN DENMARK OR SWEDEN?

Call for a FREE Mac Zone Scandinavia Catalog

Denmark: 86-22-83-66
fax: 86-22-70-96

Sweden: 08-665-09-90
fax: 08-661-50-70

NOW SHIPPING
Weekdays till 2 am E.T.

Extended Shipping Hours!

Place Your Order till 2 A.M. E.T. for Same Day Shipping • Only \$3

The Mac
Zone
Established 1986

QUALITY STORAGE DRIVES...AT AMAZING PRICES



52 MB Quantum External HD **\$358**

Our 52MB Quantum is not only fast and reliable, but attractive and ergonomically pleasing as well. Some of its features include: 3.5" LPS drive type, an average access time of less than 17 milliseconds and a throughput speed of 2 to 4MB per second. DPI #04880 ✓



- Compact, space-saving chassis: Connor, Fujitsu and Quantum externals
- 2-Year limited warranty: Quantum and Syquest
- Top-quality components by PLI, the leading manufacturer of after-market hard drives
- Driven by award-winning software
- All DPI drives are covered by a complete 60-day money back guarantee. If, for any reason, you are not completely satisfied with your drive, call us for an RMA number and return it to us for a full refund.

GET CONNECTED WITH MAC TURBO

Best
Buy!



MacTurbo 2400 **\$89** Mini Modem

Our MacTurbo modem has all the features you would expect to find on modems twice the price—and at 6" by 4" it's compact enough to easily tuck away in a briefcase. An eight-light status panel keeps you informed as to the status. Nonvolatile memory stores phone numbers even when the modem is turned off. MacTurbo #00408 ✓

MacTurbo 24/96 Mini Fax/Modem
#00977 **\$149** ✓

SKU#	Formatted MB	Drive Type	Drive Mechanism	Access Time	Throughput MB/Sec	ZONE PRICE	Cost/MB
04880	52	3.5"LPS	Quantum	17	2.0-4.0	\$358	\$6
04881	105	3.5"LPS	Quantum	17	2.0-4.0	498	5
04882	240	3.5	Quantum	16	5.0-10.0	\$848	4
05367	330	3.5	Fujitsu	12	4.0-5.0	1318	3.2
05366	520	3.5	Fujitsu	12	4.0-5.0	1538	4.3
04451	45	5.25"	Syquest	19	1.2	548	12
04886	88	5.25"	Syquest	19	1.2	698	8



SyQuest 44MB Removable Cartridge **\$69**

With removable SyQuest cartridges your storage capacity is virtually limitless. Lifetime warranty. SyQuest #02183

SyQuest 44 MB 5 Pk #05442 **\$328**
SyQuest 44 MB 10 Pk #05443 ... **\$649**

MEMORY UPGRADES

With our \$3 overnight delivery you can have your SIMMs and your installation kit in your hands tomorrow!

- Inexpensive, Safe and Easy
- Plug-and-Play Installation
- Top-Quality SIMMs
- Lifetime Guarantee
- FREE! SIMM Installation Guide

4x4MB SIMMs

\$568

Maxima
2.0
FREE!

with your
4x4MB SIMMs



Purchase your 4MB SIMMs upgrade now and receive MAXIMA 2.0 FREE. MAXIMA is the unique RAM enhancement utility that creates a powerful RAM disk and gives you access to large amounts of RAM without using 32-bit addressing. Connectix #05597

Maxima 2.0 #04144 **\$44**

CALL NOW FOR OUR LATEST COMPETITIVE PRICES!

MODEL	CPU	#OF SLOTS	NS	MB AFTER UPGRADE	ORDER PART #	MB/MODULE	PRICE/MODULE
PLUS /SE	Plus/SE	4	80	4	03428	1	\$ 34
CLASSIC with adapter	Classic	2*	80	4	03428	1	\$ 34
MAC II, IIX, IICX, IICI	Mac II, IIX, IICX, IICI	8	80	8	03428	1	\$ 34
	Mac II, IIX, IICX, IICI	8	80	32	03584	4	137
	Mac II, IIX, IICX, IICI	8	80	64	00848	8	499
	Mac II, IIX, IICX, IICI	8	80	128	00849	16	799
MAC II FX	Mac IIFX	8	70	8	03579	1	\$ 42
	Mac IIFX	8	70	32	03585	4	189
	Mac IIFX	8	70	128	00849	16	698
QUADRA 700,900	Quadra 700	4	70	8	03579	1	\$ 42
	Quadra 700	4	70	20	03583	4	124
	Quadra 900	16	70	16	03428	1	34
	Quadra 900	16	70	64	03583	4	124
	Quadra 900	16	70	128	00848	8	498
	Quadra 900	16	70	256	05338	16	698
POWER BOOK	PB 100/140/170	1	80	4	05391	2	\$ 148
	PB 140/170	1	80	6	05392	4	268
	PB 140/170	1	80	8	05393	6	398
LASERWRITER	LaserWriter NTX	12	70	12	03586	1	\$ 49
SE/30, IISI	SE/30	8	80	8	03428	1	\$ 34
	SE/30	8	80	32	03583	4	124
	Mac IISI	4	80	5	03428	1	34
	Mac IISI	4	80	9	03936	2	274
LC/LC II Classic II	Mac LC/LC II/Classic II	2	80	4	03428	1	34
	Mac LC/LC II/Classic II	2	80	6	00014	2	68
	Mac LC/LC II/Classic II	2	80	10	03976	4	158 ⁵⁰

Corporate P.O.s Welcome

Call Us and Establish Your Corporate Account

OVER 2400 PRODUCTS IN STOCK—CALL NOW

☐ = System 7 Compatible ✓ = Money Back Guarantee

ACCELERATORS, MEMORY, UPGRADES, INTERNAL ENHANCEMENT

Applied Engineering

04154 QuickSilver IIsi w/FPU 268 ☐

DayStar

05004 Combo Cache IIsi w/Math Chip328 ☐ ✓
04323 Univ. PowerCache 33MHz 608 ☐ ✓
04634 Univ. PowerCache 33MHz/FPU748 ☐ ✓
04319 Univ. PowerCache 40MHz 838 ☐ ✓
04320 Univ. PowerCache 40MHz/FPU1028 ☐ ✓
04321 Universal PowerCache 50MHz1218 ☐ ✓
04322 Univ. PowerCache 50MHz/FPU1498 ☐ ✓

Iomega

09916 Bern 90MB Cart 3pk 438

Radius

04207 Radius Rocket #244 1798 ☐ ✓
00821 Radius Rocket 25i 1348 ☐ ✓
01004 Rocket 25i/24X Crd Bld 2498 ☐ ✓
05250 Radius Rocket 33 2178 ☐ ✓

ACCESSORIES

American Ink Jet Refill Kits

05066 PaintJet 2 pack 18
05067 Canon BubbleJet BJ-10e 2 Pk .. 14

Kensington

04690 Notebook Traveler Deluxe Case 78 ✓
05176 TurboMouse 4.0 106 ✓
03342 Power Tree 20 27 ✓
03343 Power Tree 50 54 ✓
03345 Power Backer 400 268 ✓

Targus

07454 Universal PowerBk Case 68

BUSINESS ESSENTIALS

Acius

03605 4th D 2.1 Compiler 878 ☐ ✓
02648 4th D 2.2 508 ☐ ✓

Apple Computer

05433 System 7 Personal Upgr Kit 78 ☐

Beagle Bros.

04583 BeagleWorks Comp. Upgr. 94 ☐ ✓

Claris

04466 Claris Works 196 ☐ ✓
03478 FileMaker Pro 198 ☐ ✓
04140 MacProject II 2.5 344 ☐ ✓
04703 MacWrite II 1.1 88 ☐ ✓

Frame Technology

03582 Frame Maker 3.0 594 ☐

Intuit

04230 Quicken 3.0 Mac 42 ☐ ✓

Jian

04257 Biz Plan Builder 78 ☐ ✓

Lotus

00518 Lotus 123 Mac Comp Upgr 94 ☐ ✓

Microsoft

04161 Microsoft Project for Mac 448 ☐ ✓
00227 Microsoft Excel 4.0 Mac 294 ☐ ✓
04545 MS Excel 4.0 Mac Upgrade 98 ☐ ✓
00427 Microsoft Office 2.5 474 ☐ ✓
04898 Microsoft Word 5.0 Mac 294 ☐ ✓
00596 MS Word 5.0 Upgr Mac 124 ☐ ✓
02581 FoxBase+/Mac 2.01 288 ☐ ✓

Quark

04736 Quark Xpress 3.1 579

Softsync

00344 Accountant Inc. 3.0.1 328 ☐ ✓

Software Ventures

04893 Microphone II 4.0 198 ☐ ✓

Symantec

04095 Thlnk C 5.0 198 ☐ ✓

T/Maker

00641 WriteNow 3.0 148 ☐ ✓

WordPerfect

03972 WordPerfect 2.1 289 ☐ ✓

ENTERTAINMENT & EDUCATION

Abacus

00032 Statview II 4.0 348 ☐

Broderbund

03994 Kid Pix 1.2 33 ☐

Graphics Simulations

01046 Hellcats Over the Pacific 39 ☐ ✓

Software Toolworks

00577 Miracle Piano Mac 348 ☐ ✓

Wolfram Research

04107 Mathematica Enhanced 2.0 ... 798 ☐ ✓

GRAPHICS

Adobe

04983 Adobe Illustrator 3.2 w/ATM .. 368 ☐ ✓
02870 Adobe Plus Pk for Type Mgr .. 108 ☐ ✓
03497 Adobe Type Mgr 2.0 58 ☐ ✓
04042 Photoshop 2.0 548 ☐ ✓

Aldus

00333 Aldus Freehand 3.1 394 ☐ ✓
04573 Aldus PageMaker 4.2/Preprint494 ☐ ✓
00346 Aldus Persuasion 2.1 324 ☐ ✓

Claris

04073 MacDraw Pro 1.5 274 ☐ ✓

Computer Associates

00203 Cricket Graph 1.3.2 134 ☐ ✓

DeltaPoint

04805 Deltagraph Pro 198 ☐ ✓

Denaba

00803 Canvas 3.0 248 ☐ ✓

DesignCAD, Inc.

04180 Design CAD 2D/3D 158 ☐ ✓

FontBank

04986 FontBank Type Companion 94 ☐

Fractal

00665 Fractal Design Painter 1.2 234 ☐

GraphSoft

03540 MiniCAD Plus 594 ☐ ✓

MacroMedia

04498 Model Shop II 1.0 549 ☐ ✓

04808 Swivelman 3D Pro 1.0 w/MacR.598 ☐ ✓

05018 Pro. QuickTime Authoring Kit 998 ☐ ✓

00839 MacroMedia Director 3.1 688 ☐ ✓

Microsoft

01220 Microsoft PowerPoint 3.0 244 ☐ ✓

Strata

04088 Stratavision 3D 2.5 628 ☐

MODEMS & FAX

Global Village

00948 Powerport V.32 W/SR Fax 488 ☐

00949 Teleport Fullfax 218 ☐

Hayes

04796 Hayes Ultra 9600 w/Smartcom758 ☐

MacTurbo

00977 MacTurbo 24/96 Fax 149 ☐ ✓

00408 MacTurbo Plus Modem 89 ☐ ✓

Prometheus

00907 Home Office 24/96 w/Voice ... 258 ☐ ✓

00877 Home Office Ultima Ext 488 ☐ ✓

PSI

04948 Powermodem 24/96SR Int 205 ☐

Supra

04351 Supra Fax Modem Plus 178 ☐

NETWORKING

Asante

00348 Asante 10T HUB/12 528 ☐

00819 Asante Maccon + 30IE MC 258 ☐

00324 Asante Maccon + LC MC 314 ☐

04933 Asante Maccon 3 IIsi 249 ☐

00511 Asante Maccon 3 Nubus 64K . 218 ☐

Cayman

00181 Gator Box CS 1858 ☐

CE Software

04168 QuickMail 2.5.2 10 User 375 ☐ ✓

Dayna

00003 Dayna Etherprint 10T EP0101 342 ☐

Farallon

04739 24 Port Star Control. PN377 1298 ☐ ✓

00353 Phonenet CDR PC Ltlk PN380 208 ☐ ✓

00828 Phonenet DIN 8 10pk PN310 . 197 ☐ ✓

00829 Star Controller 300Ser PN307 886 ☐ ✓

03333 Star Controller En PN507 1358 ☐ ✓

Shiva

02542 Shiva TeleBridge 408 ☐

PRINTERS, INPUT & DISPLAY DEVICES

Advanced Gravis

02741 Mousestick Joystick ADB 58 ☐ ✓

Applied Engineering

04956 AE Plus Drive - 1.44/800k FD . 298 ☐

Articulate Systems

03932 Voice Navigator II 588 ☐ ✓

Caere

04459 The Typist Plus Graphics 458

DataDesk

04318 Mac 101E Kyb w/Quickeys II 2.194 ☐ ✓

Dest

03929 Dest Scan/ Recognize OCR 684 ☐

Generation Systems

04588 Gen. Sys. 14"Clr Mon 498

Kensington

00638 Kensington Notebook KeyPad 104 ✓

Logitech

04258 Mouseman Mac 76 ☐ ✓

02561 Scanman Mod.32 Digital Dkrm294 ☐ ✓

00670 Scanman Mod 32 w/Catchw Pro378 ☐ ✓

Micron

00608 Xceed MacroColor II 24Bit Brd468 ☐

Microtek

00369 Microtek 600ZS Clr/Gray 1398 ☐

00370 Microtek ScanMaker 1850S 1898 ☐

04047 Microtek TrueLaser Printer .. 1398 ☐

NEC

04985 MACFG 24X Clr Intfc Crd 1598 ☐

00578 MACFG 8X Clr Display Intfc Cd798 ☐

07144 Multisync 3FGX 15" Mon 658 ☐

07143 Multisync 4FG 15" Mon 778 ☐

07399 Multisync 5FG Mon 17" 1398 ☐

Radius

04901 Powerview 539 ☐

04206 Radius Pivot Display Clr 277 1298 ☐

Rasterops

00005 24 Stv 2536 778 ☐

00521 24XLTV 2888 ☐

03482 Video Expander 484 ☐

Sigma

00571 Power Pg PVM-GR 1500A 784 ☐

00399 Power Portrait 15" PLT 784 ☐

Sony

02566 Sony 1304 14" Mon w/Cbl 695 ☐

SuperMac

05125 SuperMatch 20" Dual Trinitron2698 ☐

00613 VideoSpigot NuBus 428 ☐

05111 VideoSpigot Pro NuBus 1458 ☐

Texas Instruments

04096 TI PS 17 Laser w/Apple Talk 1298 ☐

04313 TI PS 35 Laser w/Apple Talk 1699 ☐

Thunderware

00520 Lightning Scan Pro 256 488 ☐

UMax

00599 24bit UC 630 w/Photoshop .. 1389 ☐

Wacom

00087 12x12 Static Sur 421E 935 ☐

03677 SD-420E 12x12 StdSur 718 ☐

SIMMs

03428 Two 1x8 1MB SIMMs (80NS) .. 68 ☐

03936 IIsi SIMMs Module2MB(Qty 4)274 ☐

00014 Mac LC SIMMs 2-2MB 2x8x80138 ☐

04987 Powerbk 6MB SRan 140,170 . 368 ☐

03584 4x4 for II/Ix Only 548 ☐

03585 4x4MB fx 189 ☐

03583 4x4MB SE30/IIcx,Ci,Quadra .. 124 ☐

03976 LC 2-4MB 258 ☐

SYQUEST CARTRIDGES

05442 Syquest 44MB 5pk 328 ☐ ✓

02183 Syquest 44MB Cart Unfo 69 ☐ ✓

04142 Syquest 44MB Cartridge 5pk . 328 ☐ ✓

05443 Syquest 44MB 10pk 649 ☐ ✓

00183 Syquest Cart 88MB 106 ☐ ✓

STORAGE DEVICES

FWB

00506 100MB Pocket Hammer Dr 748 ☐

Iomega

09728 Bern Transport 90MB DR 694 ☐

Mass Micro

00332 DataPak MO/128 3.4" Optical 1629 ☐

00336 DiamondDrive 120P 2" Dr 549 ☐

00337 DiamondDrive 210P 2"Dr 949 ☐

00972 DiamondDrive 80P 1" Port 439 ☐

00971 Hitchhiker 80 679 ☐

04062 Mac Micro DataPak 88 798 ☐

00175 Mass Micro Datapack 45 Rem 598 ☐

NEC

05444 NEC CDR 37 w/Mac Interface 388 ☐

05445 NEC CDR 74 w/Mac Interface 578 ☐

05414 CDR 37 w/CD Gallery 475 ☐

05415 CDR 74 w/CD Gallery 698 ☐

PLI

04881 DPI 105MB Q Ext Quantum 498 ☐

04451 DPI 45MB Syquest 548 ☐

04880 DPI 52MB Ext Mini Dr 358 ☐

02181 Infinity 40 Turbo HD Rem 598 ☐

Get the Most Out of System 7 With Super 7 Utilities

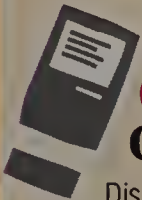


1 Mighty Menus:

Are tear off menus which are available to you from any application including the Finder.

2 Printer Picker:

You'll select your printers from one, handy pull-down menu.



3 Super Comments:

Displays Get Info comments in Open dialogs and lets you create Get Info comments in the Save and Save As dialogs.

4 Desktop Extras:

Allow you to move or copy a file, folder or group of files and folders to a destination folder without opening up all the folders, thus saving time and eliminating desktop clutter.



5 Trash Alias:

Automatically deletes aliases of applications, files or folders when those files are emptied from the trash, eliminating dangling aliases. This utility alone can save you hours of frustration and confusion.

6 Helium Pro:

Lets you toggle Balloon Help on and off with quick keyboard commands.



7 Speed Beep Pro:

Allows you to customize the warning tones generated by your Mac.



Super 7 Utilities.....\$62

Atticus Software #05679

This collection of seven vital performance enhancement utilities exclusively for System 7 makes your Mac more powerful and productive than ever. Each utility is easy to install and use.

Atticus Software provides FREE and unlimited technical support for registered users. Support personnel can be reached via telephone, fax and America OnLine and CompuServe information services.

Environmentally-Responsible Software: Atticus Software is one of the first companies to provide a return envelope so that customers may return the folding box and cardboard liner for re-use. Extra consideration has been given to the package to minimize waste. All materials are recyclable.

7 Super Reasons To Switch To System 7

3 File Sharing:

If you're part of a network, you can share any folder or volume on your hard disk with other users—without using a dedicated server!



4 Better Font Handling:

Apple's new scalable-font technology is now built into every Mac, giving users the benefits of smooth type at sizes from 1 to 32,768 points, on-screen as well as on paper.



5 Aliasing:

Imagine that you could keep every file from every disk, cartridge, and network server you have access to—on *your* hard disk. Imagine that you could arrange your work by date, topic, application, filename—all at the same time.



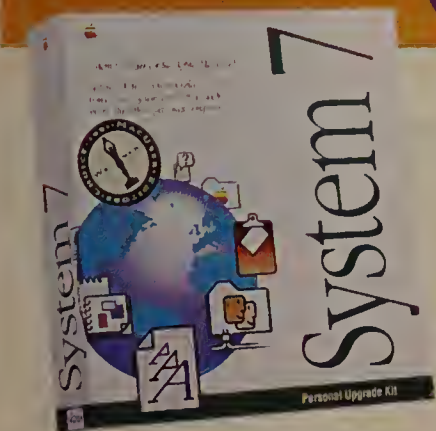
6 Finder Windows:

Organizing and accessing files is *much* easier with System 7.



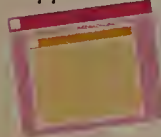
Super 7 Utilities • System 7—Bundle

Now you can purchase both super-productive programs for one incredible low price. If you're not running System 7 and Super 7 Utilities, you're not getting the most from your Mac. This offer will last for a limited time, so order today! Our Mac sales advisors are standing by at 1-800-248-0800. #05758



System 7.0 Personal Upgrade\$78

Apple Computer Co. #05433



1 Multitasking:

If you haven't been using MultiFinder, the gentle push of System 7 will introduce you to the world of doing two or more things at once. With System 7 you can always open more than one application at a time!

2 Publish and Subscribe:

"Publish" part of your document (graphic, chart, text...) to one or several other documents. When you change the original, the others will update automatically!

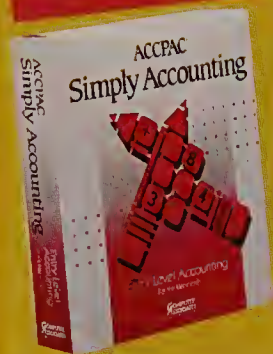
OVERNIGHT DELIVERY VIA AIRBORNE ONLY \$3 • 1-800-248-0800

NOW SHIPPING
Weekdays till 2 am E.T.



Discover the Difference

The Mac Zone Delivers Service, Selection and Value



ACCPAC Simply Accounting

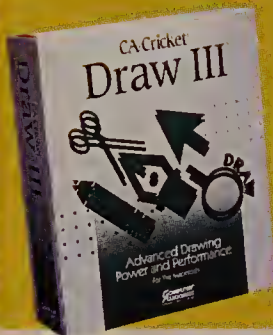
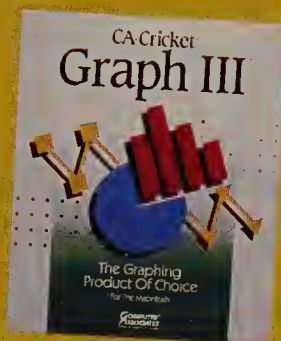
\$134

Looking for a complete entry-level accounting package? Simply Accounting contains everything you need to get up and running in a flash: a primer that walks you through basic accounting principles, understandable documentation and a complete tutorial. Computer Associates #04475 ✓✓

CA-Cricket Graph III

Designed for scientists, engineers and business people, CA-Cricket Graph offers all the powerful features you need—data access and manipulation, multiple chart types, graph attributes and formatting—in an easy-to-use package. Computer Associates #00203 ✓✓

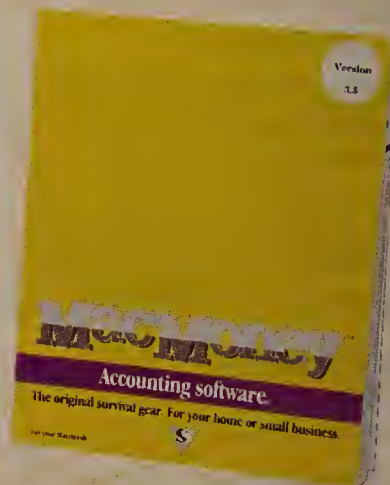
\$134



Cricket Draw III 1.1

\$199

CA-Cricket Draw is the fully-featured drawing program for producing professional-quality graphics on the Mac. It features high-end drawing power with its Bezier-based tool palette, flexible color interface and more. Computer Associates #04414 ✓✓



\$57

MacMoney 3.5

MacMoney is a full double-entry personal and small business bookkeeping system and financial planning tool. MacMoney tracks expenses, bank accounts, credit cards, assets, liabilities, cash and income. You can create up to 250 accounting categories and divide transactions among as many as 8 categories. Survivor Software #01582 ✓✓

Invoice It #02814 **\$48**



Lotus 1-2-3 for the Mac

Competitive Upgrade

\$94

Move up to the power of Lotus 1-2-3, designed exclusively for the Macintosh. Upgrade from a competing spreadsheet at this enticing upgrade price. Lotus 1-2-3 is powerful and easy to use. You'll find innovative spreadsheet capabilities that provide intuitive access to commonly used functions. It even allows you to customize your desktop to fit your individual work style. And it's completely compatible with Apple's new System 7 operating system and all earlier versions of 1-2-3. To qualify simply send us the first page from the user manual of your competing spreadsheet software product. Lotus #00518

Lotus 1-2-3 for the Mac #00507 **\$328**

White Knight 11

\$81



White Knight 11 (previously known as Red Ryder) has been called the best all-around telecommunications program available. It gives you technical sophistication, flexibility and user-friendliness... at a great price. Freesoft #02881



SCAN IT RIGHT WITH WORDSCAN PLUS

WordScan Plus for the Mac

\$374



WordScan Plus is one of the most sophisticated OCR systems you can purchase for your Macintosh. It recognizes virtually all business fonts and page layouts and it's capable of capturing everything from bold, italic and underlined fonts to tables, lists and multiple columns. Plus, you get a super-advanced Pop-Up Verifier which displays an enlarged original image of any questionable word or character for effortless on-screen proofing and editing of the scanned document. You also get Multi-Zone Templates, AutoClipping, Style Sheets, Multi-Job Processing and more. Calera Recognition Systems #04412



Volume 4: World Flags

\$67

Volume 4: World Flags Contains exquisitely detailed national and civil flag illustrations from all the independent and dependent countries of the world, plus various international, organization and code flags. Dream Maker #04282 ✓

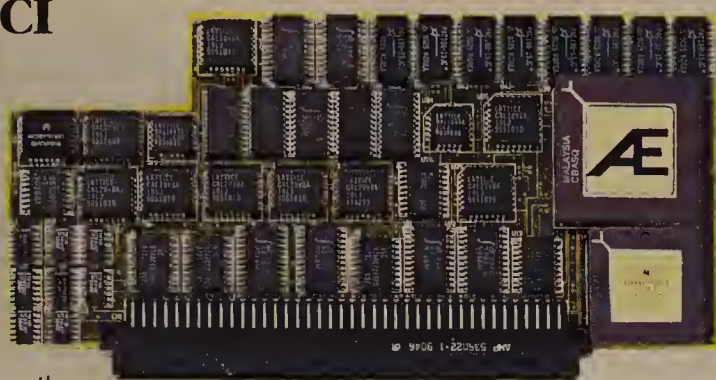
Order Our Free Fall Catalog

64 Pages • Hundreds of Products • Super Values



TransWarp CI w/ FPU

\$1834



Make your Mac IIci as fast as a IIx! With the TransWarp CI static RAM cache you'll get reliable performance at more than twice the speed of the standard IIci. TransWarp CI includes a System 7-compatible Control Panel Device that allows you to turn the accelerator on and off as desired. The software also includes a SANE patch called '882 Express. This patch can improve the speed of programs that use Apple's SANE package for their math functions by as much as 500%. The board also includes a 50MHz 68882 Floating Point Unit (FPU) math chip. The FPU greatly enhances the speed of math functions, dramatically improving the performance of spreadsheet, CADs and other math-based programs. Applied Engineering #04072

► The Speed

TransWarp CI was designed specifically for the Mac IIci—without compromise. Using a 64K fast-static RAM cache together with a 50MHz 68030 processor, TransWarp CI gives you reliable performance at *more than twice the speed of the standard IIci*.

► The Fit

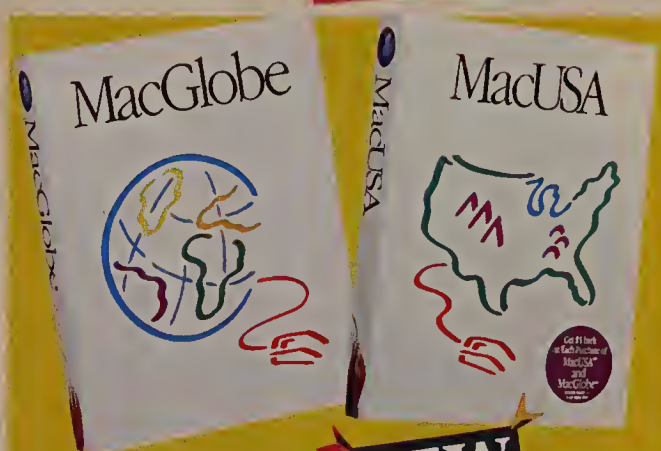
The board plugs directly into the IIci's cache socket. Its thoughtful design allows room for mass storage 5.25" hard drives.

► The Enhancement Experts

Best of all, TransWarp CI accelerators are manufactured by Applied Engineering, long a leader in Apple enhancement products. AE has more than twelve years of experience producing feature-laden peripherals that set the standard for quality and reliability.

► The Warranty

TransWarp CI is covered by the manufacturer's full 1-year warranty covering parts and labor.



NEW

MacGlobe

\$44

MacGlobe is the geography tool for anyone whose interests transcend their own time zone. It Provides stunning country maps and global information that you can use for presentations, overheads and reports. PC Globe #04328 ✓✓

MacUSA

\$32

MacUSA captures the rich panorama of life in America and puts it right in the palm of your hand. MacUSA is the ultimate national portrait, endlessly entertaining and informative, loaded with colorful maps and charts, even state flags and state songs. PC Globe #05479 ✓✓

DESIGN YOUR OWN HOME WITH ABRACADATA AND SAVE

Design Your Own Home Architecture



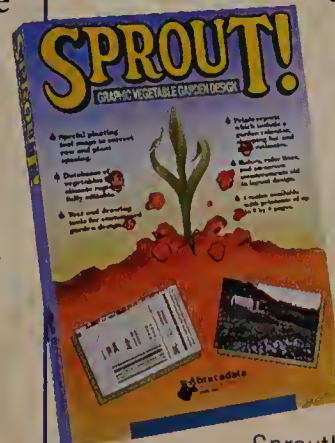
With Architecture you'll draw your own floor plans, side view building plans and plan structural details. The program automatically indicates scale, calculates lumber and does detail drawing. The overlay feature allows layering of details such as electrical or plumbing schematics and multiple floors. Abracadata #03609 ✓✓

Design Your Own Home Interiors

Interiors makes it easy to plan the decor of your home or office. Use the drawing tools and supplied patterns to bring your interiors to life! View the room from the top or from four different side perspectives. Abracadata #03611 ✓✓

Design Your Own Home Landscape

With Landscape you get a variety of drawing tools and patterns to help you plan. Use the built-in object library or draw your own trees, shrubs, etc. then view your design from four different perspectives. Plants can be aged on screen to help you determine proper placement. Comes with a variety of drawing tools and patterns. Abracadata #03610 ✓✓



Sprout!

\$42

Sprout! is a complete computer planning tool for vegetable gardeners. With it you can easily produce a graphic, scalable garden plan with correct plant and row spacing. In addition,

Sprout! contains a fully editable database of vegetables for 7 climate regions. Prints out garden layouts, calendars, shopping lists and reports. Abracadata #05085 ✓✓



DESIGN YOUR OWN HOME™

Interiors



DESIGN YOUR OWN HOME™

Landscape



Your Choice

\$48

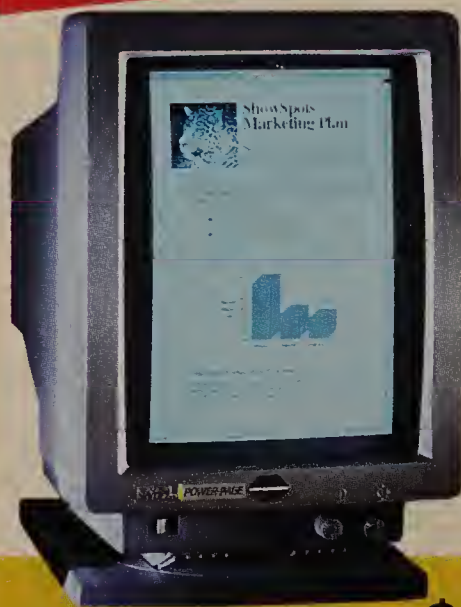
FAX YOUR ORDER 24 HOURS 7 DAYS A WEEK • 1-206-881-3421

NOW SHIPPING
Weekdays till 2 am E.T.



Power-up your PowerBook!

We Carry a Full Line of PowerBook Accessories



Power Portrait

\$784

This affordable, easy-to-install full-page display plugs directly into the SCSI port of your PowerBook, Classic, ClassicII SE or SE/30 computers. Its 15" full-page display features built in acceleration that lets you race through graphic displays. Choose between 72, 80 and 88dpi. Create a virtual two-page desktop to power through multi-page tasks. Granite color to match PowerBook. Sigma Designs #00571

The Platinum Power Portrait

#00399 **\$784**

PowerModem

24/96 SR Internal

\$205

Make your Mac work harder for you with the unbelievably affordable PSI PowerModem. The PowerModem is not only an internal send/receive fax modem, but it's also a 2400bps Hayes-compatible data modem. The Fax is Group III compatible, sends at a full 9600bps and receives transmissions at 4800bps. PowerModem will dramatically improve your PowerBook's performance. It lets you continue to work in any application while its intuitive software performs in the background. PSI #04948



Premiere Leather PowerBook Case

\$138

Pamper your PowerBook, in style! The Targus Premiere Leather PowerBook Case establishes a new standard of quality for business-related luggage. This dual-purpose case combines a luxurious, feature rich, leather briefcase together with a functional laptop carrying case. The Premiere offers four fullylined document sections in addition to a padded computer compartment. The zippered portfolio section features Velcro-secured disk pockets, pen/pencil and business card holders, two pockets for miscellaneous items, a snap-on key ring and a pouch for your glasses. Targus #05284

Universal PowerBook Case #07454 **\$68**



Special Introductory Price

\$48

Connectix
#05646

PUT MORE POWER INTO YOUR POWERBOOK

Introducing Connectix PowerBook Utilities: the first software utility created exclusively for the PowerBook

The world's best-selling notebook computer just got better! Now you can get even more productivity out of your PowerBook™, with Connectix PowerBook Utilities (CPU™).

More Battery Life

CPU's intelligent PowerManager™ extends your battery life. It gives you control over power consumption, and displays accurate battery status, time remaining, and other key information in the menu bar. CPU keeps your PowerBook up and working longer.

More Privacy

CPU protects your sensitive data. The innovative graphic and password security keeps your information safe. Whenever your PowerBook is unattended, all your files are secure, whether it's running, shut down or asleep.

More Control

CPU offers unmatched convenience. Choose menu items and dialog box selections directly from the keyboard. Spindown the hard disk, adjust the backlight, invoke security, or sleep with a single keystroke.

More Productivity

Designed exclusively for the PowerBook, CPU instantly adapts to your changing environment. A flexible menu of personal settings like Home, Office, Travel, Meeting or Power Saver lets you work more efficiently. CPU even adjusts your settings automatically between battery and AC power use.

And More

This "aggressively priced package" (MacWEEK 6/92) is "the first utility program to help conserve power and manage security on PowerBooks" (InfoWorld 7/92). CPU provides all this and over a dozen other controls, including Instant-Wake, Cursor Finder, Battery Manager, and the unique LCD Screen Saver.

CPU
CONNECTIX
POWERBOOK
UTILITIES

Get the power of CPU and put more power into your PowerBook today!

NOW SHIPPING
Weekdays till 2 am ET

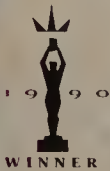
Count on Us!

The Mac Zone Means Data Protection



Norton Utilities 2.0

\$94



Norton Utilities—the essential solution for data recovery, protection and backup—now comes with SUM! You get two award-winning products for one low price! The fusion of these two products results in the first utility software package that fully integrates advanced disk repair and data recovery, automatic backup, data security and productivity enhancements and rolls them all into one informative, easy-to-use product. Symantec #04890

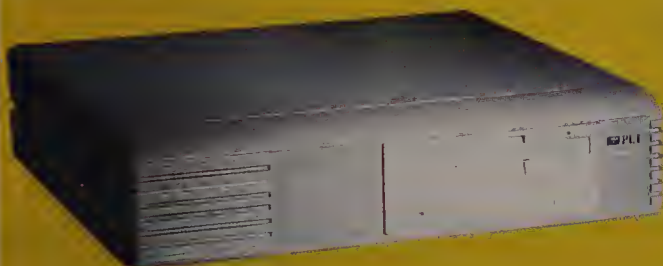
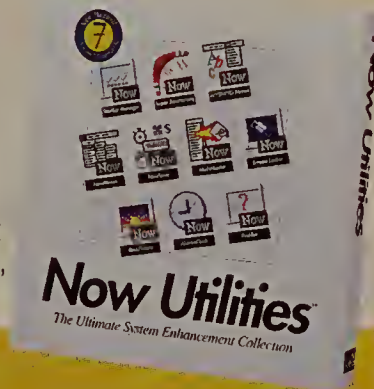


Now Utilities 3.0

\$83



According to MacUser, "Now Utilities is a must-have for experienced users and novice users alike." Included in the collection are: Super Boomerang, rated as the best of the Open & Save dialog box enhancers; StartUp Manager, a powerful extension manager; and WYS/WYG Menus, which groups font families together by typeface. Plus you get: NowSave, Screen Locker, AlarmsClock, Profiler, MultiMaster, DeskPicture and NowMenus! All components are System 7 compatible. Now Software #04191



Infinity Optical 3.5" Drive

\$1628

The next phase of optical technology has arrived! The PLI Infinity Optical read/write drives redefine high-capacity data storage. You can store up to 128MB of data on a single cartridge that is almost indestructible, and weighs less than five diskettes. Each cartridge is highly resistant to shock and magnetic fields, providing safe and portable storage. Ideal for transporting graphics files, databases or any complex software across the office or the nation. Significantly more affordable than the first generation rewritable optical drives and almost twice as fast, the Infinity Optical 3.5" makes the benefits of magneto-optical storage available to everyone. Backed by the manufacturer's 1-year warranty with support provided toll-FREE. PLI #04698



Infinity 40 Turbo

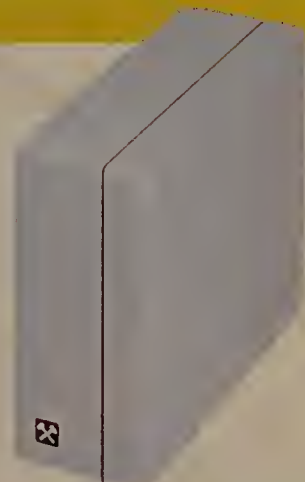
\$598

PLI's Infinity 40 Turbo provides you with all the storage flexibility you need, and the transfer speed you're looking for. Handy removable cartridges provide infinite storage potential. With PLI's TurboCache disk accelerator software, you can achieve near zero effective average access times. PLI drives are notorious for long life and dependable service. All PLI drives are factory tested to meet the highest industry specifications. One cartridge and all the necessary cables are included. PLI #02181

PocketHammer50 Hard Drive

\$524

This rock-solid, built-to last drive delivers high-end dependability for valuable data. High performance, superb engineering and reliability are built into every compact PocketHammer drive. It's small size and low weight (barely 4 pounds) make it easy to transport and secure. Assembled by hand utilizing brushed aircraft aluminum enclosures, PocketHammers function flawlessly in the most demanding environments. For professional users whose data is irreplaceable, the PocketHammer is the only choice. The PocketHammer50 includes external SCSI termination, push-button SCSI-ID selection, external fuse and software. FWB #00505



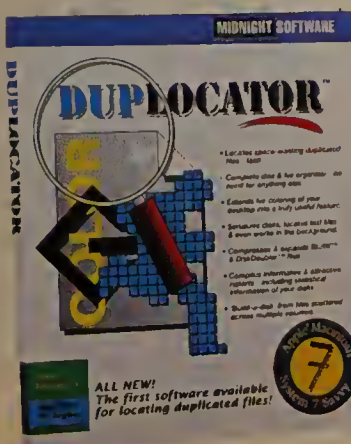
DupLocator

\$58

Find and organize your duplicated files, fast! DupLocator quickly locates and lists duplicated files. You can then use DupLocator's tools to sort, sift, serialize, identify, delete, move, copy, compare, color, catalog, compress or modify the listed files. It works with floppies, hard disks, removable media, CDs, tape drives, shared volumes—just about any storage media that can be identified as a Macintosh formatted volume. It will even mount the most stubborn of SCSI devices. It's capable of handling over 16,000 volumes at once! The highly acclaimed "Batch" feature provides a temporary storage place for files to be manipulated at a later date. Midnight Software #05598

- Locates Duplicates—No other method exists.
- Dual Directory Path lists—Allows the directory paths of similar files to be viewed and compared side by side.
- Continuous Scan—Allows rapid insertion of floppy disks.

✓ = Manufacturers providing a 30- or 60-day Money Back Guarantee. If you're not satisfied with your purchase of any ✓ item, call our Customer Service Hotline (see page 3) for a Return Authorization Number and details. Items must be returned with all original packaging and registration card.



Circle 70 on reader service card

LATEST RELEASES • OVER 2400 PRODUCTS • 1-800-248-0800

NOW SHIPPING
Weekdays till 2 am E.T.

We put a lot in so you can get a lot out.

Great Value! That's what everyone is saying about the Microcom Value Pak™ (MVP). MVP includes Microcom's complete family of essential utilities.

Virex®

NETWORK FEATURES, USER-UPDATABLE, EASY TO USE

Microcom 911 Utilities™

RECOVERS DISKS AND FILES OTHER RECOVERY PACKAGES CAN'T

Complete Undelete™

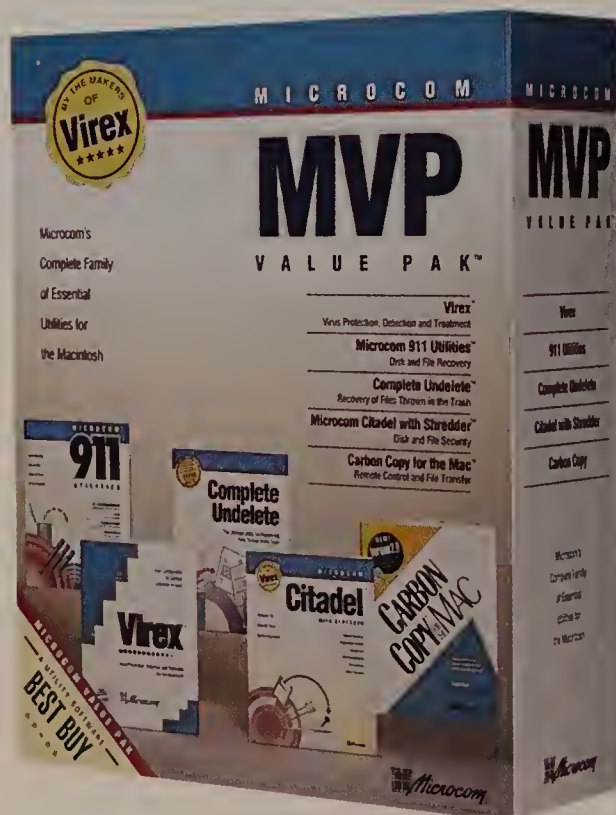
EASY, EFFECTIVE RECOVERY OF FILES DELETED FROM THE TRASH

Citadel with Shredder™

COMPREHENSIVE DISK AND FILE SECURITY

Carbon Copy™ for the Mac

COMPLETE REMOTE CONTROL AND FILE TRANSFER



MVP packs these five products in one value-priced box. See your dealer for MVP today and you too will say...

GREAT VALUE!

microcom

PO Box 51489
Durham, NC 27717
(919) 490-1277 ext.623
FAX:490-6672
BBS: 419-1602 (8,1,N)

Updates

OCTOBER 1992

THIS SECTION LISTS
THE LATEST VERSIONS OF SELECTED
MAC APPLICATIONS
THAT WERE SHIPPING BY THE TIME
WE WENT TO PRESS.

PRODUCT	V.	REQ.	★	\$
4TH DIMENSION	2.2	1MB/6.0		\$99
A4	3.1	2MB/6.0.5		\$385
AATRIX CHECKWRITER II	4.0	512K/4.1	*	
ACCOUNTANT, INC. PROFESSIONAL	3.0	1MB/6.0.3	*	
ACCUTEXT	3.0	4MB/6.0		\$150
ACTA 7	7.0	512KE/6.0.5	2/92	\$33.50
ADDOTION	2.0	2MB/6.0.5	*	
ADDRESS BOOK PLUS	2.0	1MB/6.0.2	2/92	\$25
ADOBE ILLUSTRATOR	3.2	2MB/6.0.3	*	
ADOBE PHOTOSHOP	2.0.1	2MB/6.0.2		\$199
ADOBE TYPE MANAGER	2.0.3	1MB/6.0.2		FREE
AFTER DARK	2.0v	512KE/4.1	*	
AGENT DA	2.0	1MB/6.0.5	9/92	\$30
AGFATYPE	3.0	2MB/6.0.2		FREE
ALARMING EVENTS	1.1	1MB/6.0.2		\$20
ALDUS DIGITAL DARKROOM	2.0	1MB/6.0	*	
ALDUS FREEHAND	3.1	1MB/6.0.5	6/92	*
ALDUS PAGEMAKER	4.2	4MB/6.0.5	5/92	*
ALDUS PERSUASION	2.1	4MB/6.0.5	*	
ALDUS SUPER 3D	2.5	2MB/6.0.5	*	
ALDUS SUPERCARD	1.6	2MB/6.0.4		\$50
ALDUS SUPERPAINT	3.0	1MB/6.0.5	3/92	\$65
ALIAS SKETCH	1.0.2	8MB/6.0.5	8/92	FREE
ALLIANCE POWER TOOLS	2.42	1MB/6.0.4	*	
AMAZING PAINT	1.0.3	512KE/6.0.4		\$15
AME	2.03	1MB/6.0.2		\$49.95
ANTITOXIN	2.0	1MB/6.0		\$15
APPLESHARE FILE SERVER	3.0	512K/3.2	*	
ARCHICAD	4.03	5MB/6.0	6/92	10% OF LIST
ASHLAR VELLUM	2.10	4MB/6.0.2	*	
ASHLAR VELLUM 3D	2.10	4MB/6.0.2	*	
ATONCE	1.2	1MB/6.0.5	*	
AUDIOMEDIA	2.02	2MB/6.0.7		\$29
AURACAD	3.1	1MB/4.0		\$90
AUTHORWARE PRO	1.7	2MB/6.0.5	*	
AUTOCAD	12	5MB/6.0.5		\$500
AUTOSAVE II	2.0	512KE/4.2	*	
A/UX	3.0	4MB/6.0.5	*	

PRODUCT	V.	REQ.	★	\$
AZIMUTH	2.1	1MB/6.0.2		\$45
BACKMATIC	2.0	1MB/4.2	2/92	*
BILL-IT	4.0	1MB/6.0.3		\$29
BUSINESS SENSE	1.6	1MB/6.0.7		\$69
CA-CRICKET PRESENTS	2.0.1	1MB/6.0	*	
CALENDAR	1.1.2	512KE/6.0		FREE
CANOPENER	2.0	512K/3.0		\$29
CANVAS	3.0	1MB/6.0.2	1/92	*
CAPTURE	4.0	1MB/6.0		\$30
CARBON COPY MAC	2.0	1MB/6.0.5	4/92	*
CAT III	1.2	1MB/6.0	*	
CHECKLIST	2.0	1MB/6.0	2/92	*
CHECKMARK PAYROLL	4.6	512K/4.2		\$50
CINEMATION	1.0	4MB/6.07	7/92	NA
CLARIS CAD	2.0v3	2MB/6.0		\$79
CLARIS RESOLVE	1.1	1MB/6.0.5	1/92	\$20
CLARISWORKS	1.0	1MB/6.0.5	3/92	NA
CLICKCHANGE	1.05.2	1MB/6.0.4		\$5
CLICKPASTE	2.1	1MB/6.0		\$20
CMS UTILITIES	7.0	2MB/7.0		\$25
COLOR MACCHEESE	2.0B	1MB/6.0.5		\$15
COLORSTUDIO	1.5	4MB/6.0.5	3/92	*
COMPUSERVE INFORMATION MANAGER	1.5.1	1MB/4.1	*	
COMPUSERVE NAVIGATOR	3.1	512K/4.1	*	
CONCERTWARE+	4.0	512KE/4.2		\$15
CONNECTIONS	2.1	2MB/6.0.5	4/92	FREE
CONTROL CLASSIC	1.1.3	4MB/6.0.5		FREE
CORRECT GRAMMAR	3.0	1MB/4.2	8/92	\$29.95
DATA CLUB CLASSIC	2.0	2MB/6.0	8/92	*
DATA SHAPER	1.2	1MB/6.0		\$40
DECK	1.03	2MB/6.0.7		FREE
DELTA GRAPH PROFESSIONAL	2.0	2MB/6.0.5	5/92	\$69.95
DELUXEMUSIC CONSTRUCTION SET	2.5	512K/6.0.2	*	
DESCARTES	1.04	2MB/6.0.3		FREE
D.E.S. DOCUMENT EXCHANGE SYSTEM	4.1	1MB/6.0	*	
DESIGNCAD	3.0	2MB/6.0.5	*	
DESIGNCAD 2D/3D	3.0	2MB/6.0.5		\$50
DESIGNSTUDIO	2.0	1MB/6.0	11/91	*
DESKPAINT	3.07	1MB/6.0.5		\$19.95
DIGITAL DARKROOM	2.0	1MB/6.0.4		\$80
DISKDOUBLER	3.7	1MB/6.0.2		\$15
DISKEXPRESS II	2.10	1MB/6.0		FREE

continues

V. = version #. Req. = min. RAM and system software required. ★ = last time (in the past year) this or an earlier version was reviewed. \$ = cost of update to registered owners. NA = first version, not applicable. * = contact your dealer for update policy. Blue = new version. Yellow = reviewed product.

After Dark

THE ULTIMATE SCREEN SAVER
32 incredible displays to prevent
phosphor burn-in. Flying Toasters
and fantastic Fish. Screen-locking
password protection. Company
logo and message display.
SystemIQ activity monitor.

More After Dark

An all-new collection of 26
add-on displays. Contest
winners Mowin' Man, Tunnel
and GraphStat. Virex®-D virus
scanning module from the
makers of Virex. Boris the Cat.
Lunatic Fringe space game
from the creator of Solarian II.
Beautiful new fish.

BERKELEY
SYSTEMS

Available from resellers everywhere
including MacZone

800-248-0800

ext. 21021

Circle 8 on reader service card

PRODUCT	V.	REQ.	★	\$
DISKFIT PRO	1.0	1MB/6.0	4/92	\$32.50
DISKTOP	4.0.2	1MB/6.0		*
DISPLAY ADBUILDER	1.1	1MB/6.0.3		*
DOLLARS & SENSE	5.0	512KE/3.2		*
DOUBLE HELIX	3.5	1MB/6.0		\$99
DREAMS	1.1	1MB/6.0.2		*
DYNAPERSPECTIVE	2.3	2MB/6.0.5		\$149
DYNODEX	2.0	1MB/6.0	2/92	\$25
EASY COLOR PAINT	2.02	1MB/6.0.2		*
EHELP	2.0	1MB/4.1		\$445
EMPOWER II	4.0.7	2MB/4.2		*
ENCORE	2.5	2MB/6.0.2		*
ENHANCE	2.0	2MB/6.0.3	11/91	\$100
EVOLVE	1.1	2MB/5.3		\$25
EXODUS	4.0	2MB/6.0.3		\$75
EZ VISION	1.0	1MB/6.0.3		NA
FASTBACK PLUS	2.6	1MB/6.0	4/92	*
FAST FORMS	2.0	1MB/6.0		\$25
FASTLABEL	3.1	1MB/6.0		\$10
FASTTRACK	1.5	512KE/5.5		\$20
FILEGUARD	2.7	1MB/4.2		\$18
FILEMAKER PRO	2.0	1MB/6.0		\$89
FILEVISION V	1.1	1MB/6.0.2		*
FILMMAKER	2.5	5MB/6.0.3		*
FINALE	2.6	1MB/6.0.2		FREE
FLEXICAD	2.20	5MB/6.0.4		*
FONTMONGER	1.0.5	2MB/6.0.2		FREE
FONTOGRAPHER	3.5	1MB/4.2		*
FONTSHARE	2.2	1MB/6.0		FREE
FONTSTUDIO	2.0	1MB/6.0.5		*
FORM Z	2.0	2MB/6.0		*

PRODUCT	V.	REQ.	★	\$
FOXBASE+/MAC	2.01	1MB/6.0		FREE
FRAMEMAKER	3.0	1MB/6.0	3/92	*
FREEDOM OF PRESS LIGHT	3.0.3	2MB/6.0.3		\$25
FREEDOM OF PRESS PROFESSIONAL	3.0.2A	4MB/6.0.3		\$250
FULL IMPACT	2.0	1MB/6.0		\$50
FULLWRITE PROFESSIONAL	1.5	2MB/6.0.2		*
GENERIC CADD	2.0	2MB/6.0.5		\$100
GEOQUERY	3.02	1MB/6.0		*
GOFER	2.0	1MB/4.1	6/92	\$25
GQL	3.0	2MB/5.0		\$75
GRACELAN	2.0	1MB/6.0.5		*
GRACELAN UPDATE MANAGER	1.0	2MB/6.0.5		NA
GRADE MACHINE	5.0	1MB/6.0.5	50% OF LIST	
GRAMMATIK MAC	2.05	1MB/6.0		\$15
GREAT GANTT	1.4	1MB/6.0		*
GREAT PLAINS ACCOUNTING SERIES	6.0	1MB/4.2		*
GREATWORKS	1.0	1MB/6.0.2	1/92	NA
GUIDE	2.0	512K/4.1		\$50
HAND-OFF II	2.2.5	2MB/6.0.2		FREE
HELP	1.0.1	1MB/6.0	2/92	FREE
HYPERCARD	2.1	1MB/6.0.3		\$49
HYPERDA	2.1	1MB/6.0		\$29
ICON-IT	2.1	1MB/6.0.2		*
IF:X FORMS DESIGNER	1.1	1MB/6.0		FREE
IMAGE GRABBER	3.0	1MB/6.0	2/92	\$18
IMAGESTUDIO	1.7	1MB/6.0		\$99
INFINI-D	2.0	4MB/6.0.4		*
INFOLOGIC ENVELOPE	1.1C	512KE/4.0		\$5
INITPICKER	2.02	1MB/6.0		\$10

PRODUCT	V.	REQ.	★	\$
INSIDE OUT	II	1MB/6.0.2		*
INSIGHT EXPERT ACCOUNTS PAYABLE	2.1.1	1MB/6.0		*
INSIGHT EXPERT ACCOUNTS RECEIVABLE	2.2	1MB/6.0.2		*
INSIGHT EXPERT GENERAL LEDGER	2.2	1MB/4.2		\$99
INSPIRATION	3.0.1	1MB/4.2	12/91	*
INSTANT-EXPERT PLUS	2.0	1MB/5.0		FREE
INTOUCH	1.1.7	512KE/4.2	3/92	FREE
ITHINK	2.0	2MB/6.0.2		\$149
KALEIDAGRAPH	2.1	2MB/6.0.5		\$20
KIWIENVELOPES	3.1	512KE/4.1		*
LABVIEW	2.2	4MB/6.0.5		*
LANGUAGE SYSTEMS FORTRAN	3.0	2MB/6.0.4		\$100
LAPLINK MAC III	3.2	512K/2.0		FREE
LAPLINK MAC PLUS III	3.0	512K/2.0		*
LASERPAINT COLOR II	1.02	1MB/6.0.3		FREE
LETRASTUDIO	2.0	2MB/6.0	10/92	*
LIGHTSPEED COLOR LAYOUT SYSTEM	2.5	1MB/6.0.5		*
MACANALYST	3.1	2MB/6.0		*
MACARCHITRION	5.5	2MB/6.0.3		*
MACBRAIN	3.0	1MB/6.0.5		\$295
MACDRAFT	2.1	1MB/6.0.2		*
MACDRAW II	1.1	1MB/6.0		*
MACDRAW PRO	1.5	2MB/6.0.5	11/91	*
MACENVELOPE	5.1	1MB/4.2		\$29.95
MACENVELOPE PLUS	2.0	512KE/3.2		\$50
MACFLOW	3.7	1MB/6.0		\$30
MACFORTRAN II	3.1	4MB/6.0.3		\$99



In-house production v

Introducing the first video production system that doesn't require any rewiring, rearranging or refinancing.

The new Radius VideoVision.

The only desktop video publishing system



in the entire world that integrates text, graphics, digital video and sound.

VideoVision makes creating and publishing colorful videos incredibly simple by letting you print to tape anything you can see or hear on

your desktop. Once on tape, VideoVision makes for really easy distribution of your sales presentation, training demo or educational material. It supports 24-bit flicker-free video output and drives 13" monitors in full-frame

PRODUCT	V.	REQ.	★	\$
MACGLOBE	1.0	1MB/6.0.4	4/92	*
MACLABELPRO	1.5	1MB/6.0.3		\$19.95
MACLINKPLUS/PC	6.0	1MB/6.0.3	3/92	*
MACMONEY	3.5	512KE/4.0		\$12
MACPAINT	2.0	512KE/3.2		\$25
MACPALETTE II	2.2	1MB/6.0.5	9/92	*
MACPHONEBOOK	3.0	1MB/6.0		*
MACPLOT PROFESSIONAL	4.0	1MB/6.0.5		*
MACPLOT STANDARD	4.0	1MB/6.0.5		*
MACPROJECT II	2.51	1MB/6.0		\$99
MACRECORDER	2.03	512K/3.2		*
MACRENDERMAN	1.1	5MB/6.0.5		\$75
MACROMIND DIRECTOR	3.1	2MB/6.0.5		\$149
MACSCHEDULE	2.5	1MB/6.0		\$30
MACSCHEDULE PLUS	1.0.5	1MB/6.0		FREE
MACSPIN	3.01	512K/4.3	3/92	*
MACTERMINAL	3.0	512K/3.2		\$65
MACTOOLS	2.0	2MB/6.0	10/92	\$55
MACTOPS	3.1	1MB/6.0.5		*
MACVISION	4.1	2MB/6.0.4		*
MACWRITE II	1.1v2	1MB/6.0		FREE
MANAGING YOUR MONEY	4.0	1MB/6.0.3		*
MANAPRO GENERAL LEDGER	3.1	1MB/6.0		NA
MAPLE V		2MB/6.0.7	5/92	*
MARCOPOLO	1.1	1MB/6.0		FREE
MARKET ANALYZER PLUS	2.0	2MB/6.0.2		\$99
MARKETMASTER	3.5	1MB/6.0.3		*
MARKUP	2.0	1MB/6.0		\$30
MASTERFINDER	1.1	1MB/6.0.5		*
MASTERJUGGLER	1.57	512K/6.0		\$15
MASTERPLAN	1.03	512K/6.0.5		FREE

PRODUCT	V.	REQ.	★	\$
MASTER TRACKS PRO	5.0	1MB/4.1		\$45
MATHCAD	2.06	1MB/6.0.2		FREE
MATHEMATICA	2.0	1MB/6.0		*
MATHTYPE	2.1.1	512K/6.0.2		*
MATHWRITER	2.0	2MB/6.0.5		*
MATLAB	4.0	1MB/3.0		*
MEDIATRACKS	1.01	1MB/6.0.2		FREE
MENUFONTS	4.01	1MB/6.0.5	5/92	\$20
METAPICT	2.0	512KE/4.5		\$69
MICHAEL'S DRAW	1.0	1MB/6.0.5	12/91	NA
MICROPHONE II	4.0	2MB/6.0	7/92	*
MICRO PLANNER MANAGER	1.0	2MB/6.0		*
MICROSOFT EXCEL	4.0	1MB/6.0.2	10/92	*
MICROSOFT FILE	2.0	512K/3.2		*
MICROSOFT MAIL	3.0	1MB/6.0.2		*
THE MICROSOFT OFFICE	1.5	1MB/6.0.2		\$129
MICROSOFT POWERPOINT	2.01	1MB/6.0		FREE
MICROSOFT PROJECT	3.0	2MB/6.0.4	11/91	\$149
MICROSOFT WORD	5.0	512KE/3.2	4/92	\$129
MICROSOFT WORKS	3.0	1MB/6.0.5		\$79
MINDLINK	2.0	1MB/6.0		*
MINDWRITE	2.1	512KE/4.2		*
MINICAD+	4.0	1MB/6.0		*
MOCKPACKAGE PLUS UTILITIES	4.4	512KE/3.2		\$15
MODELSHOP II	1.1	1MB/6.0.2	3/92	FREE
MORE	3.1	1MB/4.1		*
MR. FILE	1.1.1	1MB/4.2		FREE
MULTI-AD CREATOR	3.5	2MB/6.0.3		\$149
MULTILEDGER	2.0	512K/3.2		\$75
MUSICPROSE	2.1	1MB/6.0		FREE
MUSIC PUBLISHER	2.5.2	1MB/6.0	12/91	\$15

PRODUCT	V.	REQ.	★	\$
MYADVANCEDMAILLIST	3.0	512K/4.1		*
MYDISKLABELER III	3.0.4	1MB/6.0		*
M.Y.O.B.	3.0	1MB/6.0		\$79
MYTIMEMANAGER	4.0	1MB/6.0.3		*
NETMINDER ETHERNET	2.1	2MB/6.0		\$100
NETWORK BUNDLE FOR THE MAC	3.0	512K/3.2		*
NETWORK SUPERVISOR	2.0	2.5MB/6.0.3	8/92	*
NISUS	3.06	1MB/6.0.2	8/92	*
NORTON UTILITIES FOR MACINTOSH	2.0	1MB/6.0.4	10/92	\$39
NOW UTILITIES	3.0.1	1MB/6.0.4	2/92	\$49
NUBASE PRO	1.5	1MB/4.1	9/92	FREE
OMNIPAGE	3.0	4MB/6.0		\$25
OMNIPAGE PROFESSIONAL	1.0	5MB/7.0		*
OMNIS SEVEN		2MB/6.0		*
ONCUE II	2.0	512K/6.0.2		\$34.95
ON LOCATION	2.0	1MB/6.0.5	6/92	\$25
ON SCHEDULE	2.0	1MB/3.0		*
PANORAMA	2.03	1MB/6.0	5/92	*
PERFORMER	3.61	2MB/6.0.2		*
PERSONAL PRESS	2.0	1MB/6.0.3		\$39.99
PHONENET LIAISON	3.0	1MB/4.2		\$75
PHOTOMAC	1.5	2MB/6.0.3		\$75
PICKTURE	1.0	512K/6.0		NA
PICTUREBOOK+	1.0	1MB/6.0	2/92	*
PICTUREPRESS	2.0	2MB/6.0.4		*
PIXELPAINT	2.1	2MB/4.1		*
PIXELPAINT PROFESSIONAL	2.01	4MB/6.0.5		\$125
PLAINS & SIMPLE	1.06	1MB/3.2		*

continues



s. outhouse production.

resolution, 24-bit color. It also supports digital video recording through Apple's QuickTime software, and video playback at 30 frames per second, video-in-a-window. And if that weren't enough, VideoVision



is compatible with NTSC, PAL and SECAM, and lets you easily convert from one standard to another.

Get VideoShop and Action!, \$1,100 worth of software free.

If you'd like to know how to do all

this and receive a free videotape demonstration, call 1-800-227-2795. Or for immediate faxed information, dial 1-800-966-7360.

We'll take all your unnecessary wiring and turn it outside in.

radius™

DO EXTRAORDINARY THINGS.

SILVERVIEW™ PRO

A REAL PRO NEEDS TWO FULL PAGES.



Hot news for publishing and graphics pros! See two full pages on screen at once and make your job easier by light years! SilverView Pro by Sigma Designs—the only 21" flat screen with ultra-precise 1152 x 870 resolution (72 dpi) displaying 256 of the coolest grays on screen. No scrolling. No waiting. Perfect images. Call on the pro — SilverView Pro.

BUILT-IN QUADRA VIDEO SUPPORT

75 Hz REFRESH RATE

LOW-EMISSION™ DESIGN



ENGINEERING THE BEST IMAGES FOR BUSINESS

1-800-845-8086 Ext. 130

Fax: (510) 770-2640

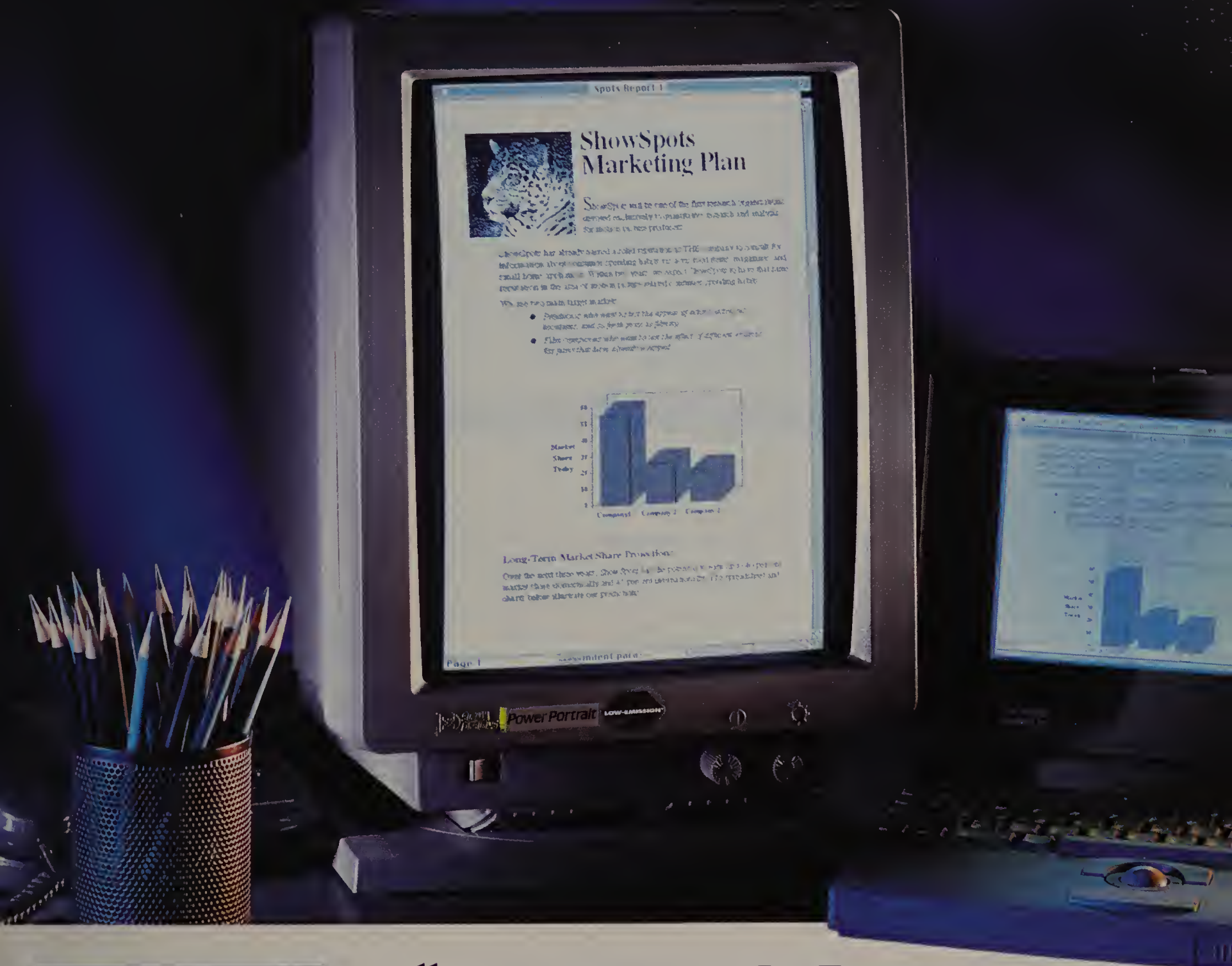
Circle 128 on reader service card

PRODUCT	V.	REQ.	★	\$
PLANISOFT	1.3	512K/4.2		\$48
POSTERWORKS	2.1	2MB/6.0.3	*	
POWERDRAW	3.0	1MB/6.0	*	
POWERSTATION	2.5.5	512K/4.1	*	
POWERTRAX	1.1	1MB/6.0.5	FREE	
PRACTICA MUSICA	2.2	512K/3.2	*	
PRESENTER PROFESSIONAL	1.0	5MB/6.0.5	NA	
PRO-CITE	2.0	1MB/6.0.2	6/92	\$95
PRODIGY	3.1	1MB/6.0	FREE	
PROFESSIONAL COMPOSER	2.3	1MB/6.0.3	FREE	
PROGRAPH	2.5	2MB/6.0	6/92	\$49.99
PROTOTYPER	3.0	1MB/4.1		\$99
PUBLISH IT	2.0	1MB/6.0	*	
PUBLISH IT EASY	2.5	1MB/4.2		\$49.95
PYRO	4.0.1	512K/4.1		\$15
QUARKXPRESS	3.1	2MB/6.0.5	7/92	*
QUICKDEX II	2.3	1MB/6.0.5	*	
QUICKEN	3.0	1MB/6.0.5	12/91	*
QUICKKEYS	2.1.2	1MB/6.0.2	*	
QUICKLETTER	1.1.5	1MB/6.0		\$25
QUICKMAIL	2.5.1	512KE/3.2	*	
QUICKSHARE	2.0	512KE/3.2	*	
QUICKSHOT	2.1	1MB/4.2		\$5
RAGTIME 3	3.1	2MB/6.0		\$150
RAY DREAM DESIGNER	2.2	4MB/6.0.5	9/92	*
READ-IT OCR PERSONAL	3.0.A	2MB/6.0.5		\$49
READ-IT OCR PROFESSIONAL	3.0	2MB/6.0.3	*	
READYSETGO	4.5	1MB/6.0	*	
RETROSPECT REMOTE	1.3	1MB/6.0	*	
RIGHTWRITER	3.2	512K/3.0		\$9.95
RIVAL	1.1.9v	1MB/6.0	FREE	
RUNPC	3.1.2	512K/6.0.4	NA	
SAM	3.0	1MB/6.0		\$29
SCHEDULEMAKER	3.01	1MB/6.0		\$25
SCSI PROBE	3.4	2MB/6.0	FREE	
SCULPT 3D	2.1	8MB/6.0.5	FREE	
SCULPT 4D	2.1	8MB/6.0.5		\$1000
SEND EXPRESS	2.1	1MB/6.0.2	*	
SENSIBLE GRAMMAR	2.1	1MB/5.0		\$30
SHADOWWRITER	2.0	2MB/6.0.3		\$20
SILVERLINING	5.31	1MB/6.0	*	
SMALL BUSINESS ACCOUNTING SYSTEM	2.1	512K/4.1	FREE	
SMART ALARMS	3.07	1MB/6.0.2		\$28
SMARTCOM II FOR THE MAC	3.3	1MB/6.0.5	*	
SMARTFORM DESIGNER	1.1	1MB/6.0	FREE	
SMARTSCRAP & THE CLIPPER	2.1	1MB/6.0.3		\$40
SNAP	3.2	1MB/3.0	2/92	*
SOUND DESIGNER II	2.2	2MB/6.0.5	*	
SPELLING COACH PROFESSIONAL	3.1	512KE/4.2	*	
SPELLSWELL	2.3	512K/3.2		\$20
SPINNAKER PLUS	2.0	2MB/6.0		\$45
STATISTICA/MAC	2.0	1MB/6.0.5	FREE	
STATUS MAC	3.0	1MB/6.0	5/92	*
STEPPING OUT II	2.02	1MB/4.1	FREE	
STICKYBUSINESS	1.4	512KE/6.0.3	*	
STRATAVISION 3D	2.5	2MB/6.0.3		\$99
STUDIO/8	2.0	2MB/6.0.5		\$30
STUDIO/32	1.2	5MB/6.0.5	FREE	
STUFFIT CLASSIC	1.6	1MB/6.0	*	
STUFFIT DELUXE	2.0	1MB/6.0	FREE	

PRODUCT	V.	REQ.	★	\$
SUITCASE II	2.0	512K/4.1		\$25
SUPER 3D	2.5	2MB/6.0.2	*	
SUPERANOVA	1.11	1MB/6.0.2	FREE	
SUPERCARD	1.5	1MB/6.0.5		\$55
SUPERGLUE II WITH GLUENOTES	2.01	512K/6.0		\$25
SUPERLASERSPOOL	3.0	2MB/6.0		\$30
SUPEROFFICE	2.02	2MB/6.0.7	FREE	
SUPERSPOOL	5.0	512K/4.1		\$30
SWIVEL 3D	2.0	1MB/6.0.5		\$75
SWIVEL 3D PRO	2.0	4MB/6.0.5		\$150
SYSTAT	5.2	2MB/6.0	*	
TASK MONITOR	4.0	1MB/6.0.3	FREE	
TASTE	1.02c	2MB/6.0.2	5/92	FREE
TEMPO II PLUS	3.0	1MB/4.2		\$39.95
TEXTPERT	3.01	1MB/6.0	FREE	
TEXTSCAN	4.0	1MB/6.0		\$75
THEORIST	1.1	1MB/6.0	*	
THINK C	5.0	2MB/6.0	7/92	\$89
THINK PASCAL	4.0	1MB/6.0	8/92	\$69
THOUGHTPATTERN	1.2.2	1MB/6.0	FREE	
THUNDERWORKS	1.3	1MB/6.0.2	*	
TILES	1.0.1	2MB/6.0.4	5/92	NA
TIMBUKTU	4.0.1	1MB/4.1	*	
TIMBUKTU/REMOTE	3.0	1MB/4.1	*	
TIMESLIPS III	2.1	1MB/6.0.2	9/92	*
TOPDOWN	3.1	1MB/6.0.4		\$99
TOPSCAN PLUS	1.0	2MB/6.0.5	NA	
TOUCHBASE	2.0	1MB/6.0.5	8/92	*
TRAPEZE	2.1	1MB/6.0.2	FREE	
TRUEFORM	2.1	1MB/6.0	FREE	
TSCRIPT	3.0	1MB/6.0		\$60
TYPEALIGN	1.04	1MB/6.0	FREE	
TYPEUNION	1.01	1MB/6.0	FREE	
TYPESTYLER	2.0	2MB/4.0		\$25
ULTRAPAINT	1.03	1MB/6.0.2	FREE	
UNIVERSAL SOFTPC	2.5	2MB/6.0	11/91	\$99
VENTURA PUBLISHER	3.2	2MB/6.0.5		\$59
VERSACAD/MACINTOSH EDITION	4.0	2MB/6.0.5		\$295
VERSATERM	4.6	800K/4.2		\$20
VERSATERM PRO	3.6	800K/4.2		\$20
VIDEOPAINT	1.1	2MB/6.0.3		\$35
VIREX	3.8	1MB/4.2		\$15
VIRTUAL 2.0 FOR 030	2.0.4	2MB/6.0	FREE	
VIRTUAL 2.0 FOR MAC II	2.0.4	2MB/6.0	FREE	
VIRTUAL 3.0 FOR MAC PLUS	2.0.4	2MB/6.0	FREE	
VISION	1.32	2MB/6.0.3		\$29
WHITE KNIGHT II	1.12	1MB/6.0.2	*	
WILLMAKER	4.0	512K/4.2		\$29.95
WINGZ	1.1	1MB/6.0	FREE	
WORD FINDER	2.0	512K/3.2	*	
WORD FINDER PLUS	1.0	512KE/6.0		\$19.95
WORDPERFECT FOR THE MACINTOSH	2.1	1MB/6.0.3	6/92	*
WORDPERFECT OFFICE	3.01	1MB/6.0.5	12/91	NA
WORDSCAN	1.0	4MB/6.0.5	3/92	NA
WORDSCAN PLUS	1.0	4MB/6.0.5	6/92	NA
WRITENOW	3.0	512K/4.2	9/92	\$49.95

To have your products considered for this section, send a press release to *Updates, Macworld*, 501 Second St., San Francisco, CA 94107, or send a fax to 415/442-0766.

Just Plug It In!



Power Portrait™

Plugs directly into the SCSI port of any Mac Plus, Classic, Classic II, SE, SE/30 or PowerBook. Connects anywhere on the SCSI chain. Complete with cable.

Full Page Power at Its Best.

Full-page power has never been easier to install or more affordable. Our 15" full-page Power Portrait™ display plugs directly into the SCSI port of your Mac. No cards to buy or install. No loss of slots. No external box. With **Power Portrait**, it's so easy!

Built-in QuickDraw acceleration lets you race through graphic displays and minimize scrolling time. Select 72, 80, or 88 dpi to view your work at its best resolution. Hardware pan lets you create a virtual two-page desktop to power through multi-page tasks. And **Power Portrait** meets the latest Swedish guidelines for reduced VLF/ELF magnetic field emission. **Power Portrait** comes in two coordinated colors, granite or platinum, for a sleek, well-matched look.

Call (800) 845-8086 EXT 100 for details.
You're just a plug away from full-page power!



47900 BAYSIDE PARKWAY • FREMONT, CA 94538
TEL: (510) 770-0100 • FAX: (510) 770-2640

MAC DIRECT

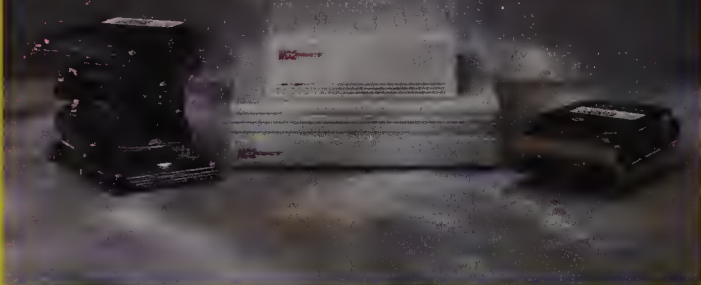
Specialists in Mac Storage

Conner Special!

- Conner 85MB LPS.\$298
- Conner 170MB LPS.\$498
- Conner 540MB Int.\$1048
- 9 to 11.5ms access time!
- Incredibly Reliable!
- Perfect for the Power User
- 120&170 are LPS for all Macs

Conner

The Drive That Apple Uses



For two years Conner has been one of Apples largest hard drive suppliers!

Conner Drives

		Internal	External
C 42 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	\$218	\$278
C 85 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	\$298	\$378
C 120 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	\$378	\$448
C 170 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	\$498	\$568
C 212 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	\$648	\$728
C 540 MB	3.5", 8.5 ms, 4500 RPM, 2 yr Warr, (Our Fastest Drive Ever!)	\$1048	\$1148

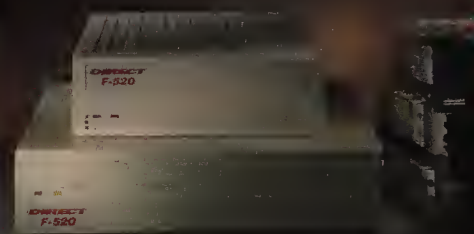
These new Conner drives are so reliable, that Conner has been one of Apples largest suppliers of drives. The 150,000 hours Mean Time Between Failure and the incredible speed of the 540 are just two reasons to buy a Conner. Give us a call and we'll tell you the rest...

Fujitsu Drives

		Internal	External
330 MB	3.5" 9ms, 5yr warr, 200,000 MTBF	\$1048	\$1148
425 MB	3.5" 9ms, 5yr warr, 200,000 MTBF	\$1098	\$1198
520 MB	3.5" 9ms, Fast SCSI, 5yr warr, 200,000 MTBF	\$1098	\$1198
680 MB	5.25" 16ms 5yr warr, 200,000 MTBF	\$1288	\$1388
1.2 Gig	5.25" 11.5ms, 5yr warr, (MacWorlds Fastest Gig!)	\$1798	\$1898
2.06 Gig	5.25" 11.5ms, 5yr warr, (5,400RPM & Fast SCSI)	\$2888	\$2988

*Mean Time Between Failure is the average life expectancy of a drive.

The Fujitsu PicoBird 4 Drives 520, 425 & 330mb



MW
EDITORS'
CHOICE

Fast and Reliable

3.5" Optical Drives

NuDesign 3.5" 128mb Optical.....\$1298

- 30ms access time
- Read/Write reliable storage
- Includes cartridge

5.25" Optical Drives

Ricoh 600mb Optical.....\$2198

- Read write reliable storage
- Great for archiving, color scans, etc.
- Includes cartridge

Toshiba CD ROM

Toshiba 3301.....\$538

- Includes driver CD carrier and cables
- 325ms access time
- MacWorld and MacUsers Highest Rated!

Toshiba 3.5" 830mb

Toshiba 830mb 3.5"\$1488\$1588

- 12.5ms Average Seek Time
- 256k cache
- SCSI-2
- Int. for CI, Mac II, Quadra
- 1.2MB/sec transfer rate

Maxtor Drives

		Internal	External
120mb	3.5" LPS	\$358	\$438
213mb	3.5" LPS	\$598	\$698
760mb	5.25"	\$1398	\$1498
1.2Gig	5.25"	\$1898	\$1998

SyQuest 44MB & 88MB Removables

44MB Removable\$448.00

88MB Removable\$598.00

- 19ms Access time
- Both Drives include Cartridge
- Dual AC Outlets, 40 Watt power supply
- SCSI Select and 2 Year Warranty

DAT Tape Backup

NuDesign Dat 2.1 Gig Capability.....\$1298

ArDat 2.1 Gig Capability.....\$1398

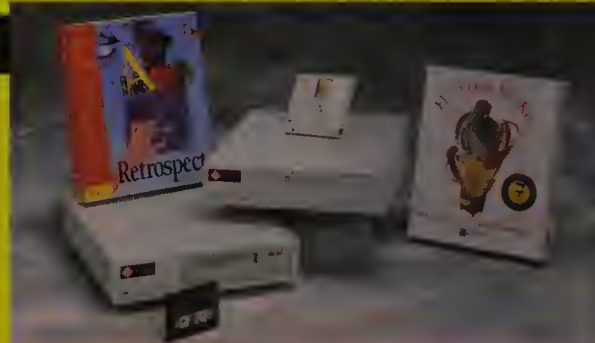
WangDat 2.1 Gig Capability.....\$1498

- Up to 10 mb per minute backup time
- Includes SoftBackup II for Fast network and unattended backup capabilities

NuDesign 2.1 Gig DAT \$1298!

NuDesign Dat 2.1 Gig Capability.....\$1298

- Up to 2.1 Gig per tape
- Our best buy ever on DAT !
- Up to 10 mb per minute backup time
- Includes a complete version of Retrospect for Fast Network and unattended backup capabilities.



MAC DIRECT

60 East Chestnut - 145, Chicago, IL 60611

Visa, Mastercard, Amex, COD, Telecheck Approved Checks, Gov., Corp., Univ., P.O.s welcome. All new Drives, preformatted with latest stable system software. Factory warranty, bracket, cables and software included. 30 Day Money back guarantee on drive products only. Return Authorization number required for returns. Prices, terms and availability subject to change without notice

800-621-8467

Hours: 8:30 - 8:00 CST, Saturdays 10:00 - 4:00
Technical Service and Order
Tracking call: 312-664-8225
8:30 - 5:00 CST

MAC DIRECT

Monitor Special!

Sony 19" Color ...\$1798

Sampo 20"\$598

• Two Page displays
• Perfect for DTP & CAD/CAM
• Include Interface cards
Full Page Display.....\$398



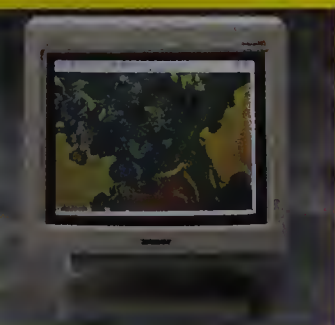
14" Goldstar Color \$388

• Plug compatible with the IIsi, Ci, Quadra and the LC



14" SONY Trinitron...\$498

• Sony 1320 for the Mac LC only.
• Sony 1304 available for \$699



16" SONY Trinitron...\$1198

• Plug compatible with the Quadra
• Plug compatible with the Ci, Si and LC at 640 x 480

SONY 19" Trinitron Color 1698.00



Sony Trinitron 19" Color System

8 Bit with RasterOps 8XL **\$1798.00**

24 Bit With RasterOps PaintBoard **\$2598.00**

- The SONY 19" Trinitron is one of our best buys yet! True Trinitron color at a great price!
- Includes 8 bit or 24 Bit Video board and cable
- 2 page display supports all Mac IIs', the Si, SE-30, and the LC

Sampo* 20" Mono System \$598.00

Grey Scale System \$898.00

- The SAMPO is a high quality dual page display without the high cost!
- Includes 1 bit, or 8 bit Bit Video board and cable
- 2 page display supports all Mac IIs', the Si, SE-30, SE and the LC

NuDesign Full Page Grey Scale \$398.00

- Plug compatible with Si, Ci and Quadra (16 levels of Grey).
- Available with 1 Bit interface card for all Mac IIs', SE-30, SE and LC \$488.00.

* 20" Monitor manufactured by Sampo for Apollo/HP



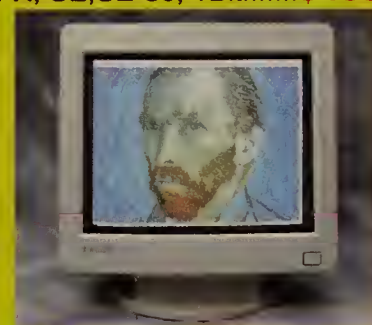
19" Sony Trinitron System

W 8 Bit interface.....\$1798
W 24 Bit interface.....\$2598



NuDesign Full Page Display

Grey Scale For Ci, Si, Quadra. **\$398**
Ii, IIfx, FX, SE, SE-30, 1Bit.....\$488



20" Ikegami Trinitron System

W/RasterOps 8Bit.....\$2398
With 24Bit.....\$3198

UMAX 600 DPI COLOR SCANNER & Other Scanners

Umax UC-630 With PhotoShop\$1148.00

Transparency/Slide Scanner Option.....\$798.00

Automatic Document Feeder\$498.00

- Rated four mice by MacUser (Dec '91) • Rated fastest by MacUser (Dec '91)
- "Boasts the highest vertical resolution..." "Tamarack and Umax produced the best images..." MacUser
- "Tamarack and Umax excel in speed and color accuracy" MacUser
- Includes Adobe Photoshop • 8 1/2 x 14 Scanning area

UG-630 With PhotoShop Grey Scale Scanner\$898.00

Umax UC-1200S With PhotoShop\$3998.00

Transparency/Slide Scanner Option.....\$898.00

- Incredible 1200 dpi scanning resolution recognizes 1 billion colors internally
- Single-pass design increases scanning speed
- Includes Adobe Photoshop

Sharp JX-320 With PhotoShop\$1598.00



MAC DIRECT

60 East Chestnut - 145, Chicago, IL 60611
Visa, Mastercard, Amex, COD, Telecheck Approved Checks, Gov., Corp., Univ., P.O.s welcome. All new drives, preformatted with latest stable system software. Factory warranty. Bracket, cables and software included. 30 Day Money back Guarantee covers drive products only. Return Authorization number required for returns. Prices, terms and availability subject to change without notice.

Circle 58 on reader service card

800-621-8467

Hours: 8:30 - 8:00 CST, Saturdays 10:00 - 4:00
Technical Service and Order
Tracking call: 312-664-8225
8:30 - 5:00 CST

Video Training Becoming Most Popular, Least Expensive Way to Learn Macintosh Programs

*Macintosh Programs Can Now Be Learned in a Few Hours With A
Unique MacAcademy Video Speed Learning System*

Over the past five years I've been associated with over 100,000 people attempting to learn the Macintosh computer. I've watched as each one waged their own personal, private battle trying to master the Mac and the most popular Macintosh programs.

I've felt their frustration, have empathized with their confusion and have understood their computer fears. I've talked to employees who had new computers and new programs dropped on their desk with the directive to "learn this." I've listened to people who struggled night after night trying to read and understand a computer manual. It's amazing how a computer manual can make a fairly bright person feel totally inept.

You'd be surprised at the number of people who have confided in me the fact they've given up trying to learn some of the programs. They've put the box on the shelf and simply written the expenditure off as a bad investment.

Hard Earned Money Wasted

Can you imagine how much money has been wasted on programs and computers that are sitting abandoned? Right now think of the people working on Macs in your office. Do they really understand the computer? How many programs are each of your people using? Have they really mastered the programs? Do they know the shortcuts and valuable techniques that will save you time, money and increase your professionalism?

An Excellent, Low Cost Training Answer

Five years ago I founded MacAcademy. My purpose was to create a training organization that provided training similar in nature to the Macintosh itself - simple, easy to use and effective.

Now, five years later the concept has proven to be a great success. Right now people are benefiting from MacAcademy training in over 100 cities in the U.S., in Canada, Great Britain, Australia, Japan, Hong Kong and 22 additional countries throughout the world.

MacAcademy training is successful for one reason - it works!

The Video Answer

Three years ago we introduced the MacA-

cademy Video Training Library. This library now includes over 80 different titles. Each video is 2 hours long and offers clear, concise, effective training. In some cases you can receive up to 8 hours of training for one program.

MacAcademy has resisted the temptation to follow competitive training programs who have recently implemented large price increases. Our videos started out at \$49 each and are still only \$49. This low cost training alternative has proven to be the Macintosh training choice of over 10,000 companies.

Guaranteed Results

The MacAcademy reputation is excellent. Our guarantee is simple: If you're not happy we'll refund your money. No hassles or problems.

To Order

Here is a partial list of over 80 MacAcademy Video training tapes now available. To order, simply send check, credit card information, or purchase order to MacAcademy Videos Dept. MW 1002 477 S. Nova Rd. Ormond Beach, FL 32174 or call the numbers listed below. Now is the time to start training. Thank you for allowing MacAcademy to help you in that effort.

Adobe Illustrator 3.2 Part 1	<input type="checkbox"/>
Adobe Illustrator 3.2 Part 2	<input type="checkbox"/>
Adobe Illustrator 3.2 Part 3	<input type="checkbox"/>
Adobe Photoshop Part 1	<input type="checkbox"/>
Adobe Photoshop Part 2	<input type="checkbox"/>
Adobe Photoshop Part 3	<input type="checkbox"/>
Adobe Photoshop Part 4	<input type="checkbox"/>
Canvas 3.0 Part 1	<input type="checkbox"/>
Canvas 3.0 Part 2	<input type="checkbox"/>
Canvas 3.0 Part 3	<input type="checkbox"/>
Claris Resolve Part 1	<input type="checkbox"/>
Claris Resolve Part 2	<input type="checkbox"/>
Claris Resolve Part 3	<input type="checkbox"/>
ClarisWorks Database	<input type="checkbox"/>
ClarisWorks Graphics	<input type="checkbox"/>

To Order: Call Toll Free

1-800-527-1914

FAX Orders Call

1-904-677-6717

48 Hour Shipments

ClarisWorks Spreadsheet	<input type="checkbox"/>
ClarisWorks W. Processing	<input type="checkbox"/>
Design & Layout Techniques	<input type="checkbox"/>
Excel 3.0 Part 1	<input type="checkbox"/>
Excel 3.0 Part 2	<input type="checkbox"/>
Excel 3.0 Part 3	<input type="checkbox"/>
Excel 3.0 Part 4	<input type="checkbox"/>
FileMaker Pro Part 1	<input type="checkbox"/>
FileMaker Pro Part 2	<input type="checkbox"/>
FileMaker Pro Part 3	<input type="checkbox"/>
Freehand 3.0 Part 1	<input type="checkbox"/>
Freehand 3.0 Part 2	<input type="checkbox"/>
Freehand 3.0 Part 3	<input type="checkbox"/>
Font Management	<input type="checkbox"/>
HyperCard Basics Part 1	<input type="checkbox"/>
HyperCard HyperTalk Part 2	<input type="checkbox"/>
HyperCard HyperTalk Part 3	<input type="checkbox"/>
Lotus 1-2-3 Part 1	<input type="checkbox"/>
Lotus 1-2-3 Part 2	<input type="checkbox"/>
Lotus 1-2-3 Part 3	<input type="checkbox"/>
Lotus 1-2-3 Part 4	<input type="checkbox"/>
MacDraw Pro Part 1	<input type="checkbox"/>
MacDraw Pro Part 2	<input type="checkbox"/>
Macintosh Networks	<input type="checkbox"/>
MacProject II Part 1	<input type="checkbox"/>
MacProject II Part 2	<input type="checkbox"/>
MacWrite II Part 1	<input type="checkbox"/>
MacWrite II Part 2	<input type="checkbox"/>
Microsoft Word 5.0 Part 1	<input type="checkbox"/>
Microsoft Word 5.0 Part 2	<input type="checkbox"/>
Microsoft Word 5.0 Part 3	<input type="checkbox"/>
Microsoft Word 5.0 Part 4	<input type="checkbox"/>
PageMaker 4.2 Part 1	<input type="checkbox"/>
PageMaker 4.2 Part 2	<input type="checkbox"/>
PageMaker 4.2 Part 3	<input type="checkbox"/>
PageMaker 4.2 Part 4	<input type="checkbox"/>
Paints & Draws	<input type="checkbox"/>
Persuasion Part 1	<input type="checkbox"/>
Persuasion Part 2	<input type="checkbox"/>
PowerPoint	<input type="checkbox"/>
QuarkXPress 3.1 Part 1	<input type="checkbox"/>
QuarkXPress 3.1 Part 2	<input type="checkbox"/>
QuarkXPress 3.1 Part 3	<input type="checkbox"/>
Quicken 3.0	<input type="checkbox"/>
SuperPaint Part 1	<input type="checkbox"/>
SuperPaint Part 2	<input type="checkbox"/>
SuperPaint Part 3	<input type="checkbox"/>
The Macintosh Part 1 (6.0+)	<input type="checkbox"/>
The Macintosh Part 2 (6.0+)	<input type="checkbox"/>
The Macintosh Part 3 (6.0+)	<input type="checkbox"/>
The Macintosh Part 1 (7.0)	<input type="checkbox"/>
The Macintosh Part 2 (7.0)	<input type="checkbox"/>
The Macintosh Part 3 (7.0)	<input type="checkbox"/>
Using System 7	<input type="checkbox"/>

**National Strength
With Personal Understanding**

Lab Notes

Pushing Scanners to the Limit

BY MARK HURLLOW

AS WE DISCOVERED DURING OUR LAB testing of slide scanners for this month's feature "Seeing Through Slide Scanners," fine-tuning a scanner to produce the best output in the least amount of time can be a tricky endeavor. For most of our testing, we focused mainly on three areas: speed, scanning resolution versus output resolution, and gamma correction.

Using a Mac IIci with 8MB of RAM and Adobe Photoshop 2.0, we began by testing scanners that enable you to scan images at different speeds (including the Tamarack/Artix Technologies ArtiScan 600S, the MicroTek ScanMaker 1850S, and the XRS OmniMedia 6cx) to find the fastest setting that could produce a high-quality image. While scanning in the slowest mode usually produces a far better image, it may take considerably longer. For example, at the fastest velocity setting (1), the ArtiScan was able to scan a test slide in 36 seconds, but at the slowest velocity setting (15), the ArtiScan took more than twice that time—85 seconds—to scan the same image. The downside was that the images scanned in 36 seconds suffered severe streaking and flaring. However, the ScanMaker and XRS's OmniMedia showed virtually no difference in quality or speed between the fastest and slowest scan speeds.

By changing a scanner's velocity setting, you actually adjust the speed of the scanning mechanism. However, if the Mac can't receive the data as quickly as the scanner can send it, the scanner must halt and wait for the computer to digest the information before starting again, thus negating the advantage of a higher speed setting. This sudden stopping and starting is what sometimes causes streaked images.

Prescanning Wisely

OUR NEXT TEST FOCUSED ON HOW quickly each scanner can perform a pre-scan, which you use to select the part of the image you want to scan and to adjust scan settings. To minimize the prescan time, we limited the prescan to an area just big enough to cover the slide and its mount (about 3 inches). Another way to save time during the prescan phase, if you're using a flatbed scanner with a transparency adapter, is to build a frame from stiff black cardboard; this makes

it easier to scan a small area consistently and also helps block unwanted ambient light that might cause loss of color or contrast.

As we expected, prescanning in color mode takes a lot longer than prescanning in black-and-white mode or gray-scale—especially with scanners using a three-pass scheme (a gray-scale scan requires only one pass, whereas most color slide scanners re-

quire one pass for each primary color). For example, the ScanMaker took 112 seconds to complete a color prescan, about three times as long as a gray-scale prescan (40 seconds)—and we found no difference in quality between the two.

Scanning Time-Savers

JUDICIOUSLY CROPPING THE PRE-scanned image before doing the final scan can also save a tremendous amount of time. For example, scanning an entire slide, including the mount (40mm by 40mm), on a Leaf Systems LeafScan 35 took 368 seconds, 55 percent more time than the 237 seconds required for the cropped image minus the mount (36mm by 24mm). The reason is obvious: scanning a full-size slide at 1000-dpi resolu-

continues



HANK OSUNA



Peachtree. The First And Best In Mac Accounting.

By now, you probably know that we invented the first Mac accounting software. And that our products have won more awards than anyone else's.

What you may not know is that our highly-rated products are now an even better value.

New Peachtree Accounting for Macintosh is only \$99. A fraction of what its predecessor sold for. It gives you all the basic functions you need: G/L, A/R, A/P, and Payroll.

For even more in-depth analysis, there's our acclaimed Peachtree Insight Accounting, now available for the single package price of \$395. A few months ago, you'd have paid over \$2000 for the same capabilities.

We back our Mac products with 30 days of free support and a money-back guarantee. So see your local dealer or call PeachLine at (800) 428-9976.



Peachtree®

The first name in small business accounting software.™



Circle 121 on reader service card

Try before you buy.

Making the right purchase decision is always difficult—without the facts it can be impossible. Now you can “kick the tires” before you buy with *The Macworld Resource CD™*.



The Resource is a high-tech consumer toolkit, complete with trial software, product demos and printable information from top Macintosh hardware and software companies.

The Resource Features:

- **Tech Report:** The first QuickTime “TV Program” - a 30 minute interactive show on the latest technology trends.
- **Productworld:** Your interactive consumer toolkit. Get detailed product literature; run interactive demos; get “hands-on” with trial software.
- **The Directory:** An up-to-date, comprehensive database of thousands of Macintosh products.

If you buy Macintosh products, *The Macworld Resource CD* is a must-have. Take advantage of the charter subscription offer and save.

To subscribe, clip & return or call
1-800-845-1924 today!

Special Charter Subscription Offer

- ☐ YES! Please send me a one-year (4 quarterly CDs) *Macworld Resource CD* subscription for only \$49.95.
- ☐ YES! Please send me the Fall '92 edition of *The Macworld Resource CD* for only \$19.95.

Name _____
Company _____
Address _____
City/State/Zip _____
Telephone _____
☐ Payment Enclosed ☐ M/C ☐ Visa
Card Number _____ Exp. Date _____
Signature _____

Clip and return to: Macworld CD Ventures,
501 Second Street, San Francisco, CA 94107.

Circle 283 on reader service card

tion requires 7.1MB of memory, compared with only 3.8MB for a 36mm-by-24mm slide. Generally, the amount of RAM should be equal to three times the image size plus 4MB for running Photoshop. And don't depend on virtual memory. Physical RAM provides much faster performance, especially when the maximum amount of memory is allocated to Photoshop.

Surprisingly, we found that hue intensity can affect scanning speed; that is, some scanners can scan a brighter image faster than a darker image. A test trial on the Barneyscan CIS 3515 showed that a low-density (light) image can be scanned as much as 80 percent faster than a high-density (dark) image. Why? When a scanner makes an automatic exposure on a prescan image, it calculates the exposure time for each color. Because rich saturations and high-density colors take longer to expose, they slow the scanning process.

The scanners with a top-to-bottom orientation—the LeafScan 35, the Nikon LS-3510AF, and the ScanMaker 1850S—performed much faster when we rotated the slides 90 degrees. For example, by rotating a slide on the Nikon scanner, we were able to complete the test scan in 174 seconds. The same image took 250 seconds to scan in normal orientation—more than 40 percent longer. When the Nikon performs a scan, it sends the Mac data in columns. Since Photoshop (and scanning software) reads data from left to right, data from a scan must be assembled and sorted into rows, a time-consuming operation, especially at high resolutions. However, if you set the scan orientation to Tall rather than Wide and then rotate the slide 90 degrees before scanning it, the Mac reads the data in rows rather than columns. Once the data is gathered, the scanning software simply rotates it back to the original position.

The Right Resolution

ONE OF THE MOST IMPORTANT FACTORS in choosing a scanner is its resolution. We considered testing each scanner's maximum resolution, which ranged from 300 dpi to 1200 dpi for flatbeds and from 1000 dpi to 4000 dpi for slide scanners. However, we soon realized that scanning at the highest resolutions would be likely to produce more detail than we needed, and would eat up more time as well as disk space. To standardize our tests and provide fairer comparisons between scanners, we decided to use one resolution for slide scanners (1000 dpi) and two (600 dpi and 300 dpi) for flatbeds. Unless your final output will be larger than 5 by 7 inches, a lower resolution will probably suffice anyway. And a 3000-dpi scan won't give you

any better output than a 1000-dpi scan if you plan to use a low-resolution (85-lines-per-inch) printer.

Gamma Correction

PERHAPS THE TRICKIEST ISSUE AND the hardest to understand is gamma setting. Before you can understand gamma correction, you need to know how data is obtained and interpreted by scanners.

A scanner contains CCDs (charge-coupled devices) that read data in a linear fashion. For example, if one color in a scanned image is twice as bright as another color, the CCDs read the brighter color's pixel value as double that of the darker one. A human eye, with its non-linear response to light, sees much less intensity difference between the two. To counteract this disparity—and get realistic-looking scans—you must apply an output gamma correction curve to the scanned data, adjusting its brightness and contrast to more closely parallel the human eye's perception of the image.

There are two types of gamma correction: output gamma mapping, which affects the scanned image itself; and monitor gamma correction, which corrects the appearance of the image on screen, so that the screen image more closely approximates the final output. But because it's easy to confuse monitor gamma correction with image gamma correction, you may think you've altered the real image when only the screen version has changed.

The LeafScan 35 and the ScanMaker 1850S let you customize your own gamma curve with a freehand tool. Where the gamma curve is adjusted upward, the pixels are brightened; where it's adjusted downward, they're darkened.

Without gamma correction, the image will lack shadow detail but be rich in highlight detail. We found that, depending on the intensity of the image, a gamma setting of 1.4 (the typical default setting) to 1.8 usually yields good results.

By experimenting with the output gamma setting in conjunction with brightness and contrast settings, we changed the brightness and contrast to produce screen images that retained all shadow and highlight details. Then we sent each scanned image to an output bureau for color balancing plus hue and saturation correction to match the original slide. We checked the output for good color matching, and for maximum highlight and shadow detail.

By the time we were through, we had coaxed some excellent output from most of the scanners. But be prepared to invest some time and effort experimenting with speed settings, resolutions, and gamma corrections—as we did—before you get the results you want. **m**

FULL-MOTION VIDEO, CRISP DIGITAL SOUND.

VideoSpigot Turns Your Mac Into A Movie Studio!

REVIEWER'S NOTEBOOK: Capture video from a camcorder, VCR or videodisc player and convert it to QuickTime™ format to play on your Mac. VideoSpigot™ delivers high-quality, 24-bit color digital-video movies, sequences, and clips. Smooth, lifelike video running at 30 frames per second — it's motion-picture quality! VideoSpigot opens the door to a world of possibilities. Audio and video are automatically synchronized for tight sound. Presentations, storyboards, training, education, and promotional materials explode off the screen! And because this is full digital video, you get unbelievably crisp detail and rich, luscious color.

Put a video clip in a word-processing document to describe a procedure or explain a policy. Include video clips in your desktop presentations to add customer testimonials, video sidebars, building sites, and other additional information.

Add outdoor/location shots in presentations, create commercial "roughs," animated simulations, and other video productions. Include a "Message from the President" in your presentations. You can even put a video clip into a document — store it on an ordinary 1.4 MB disk — and send it off to a friend. Sight and sound made simple — with VideoSpigot and the power of your Mac — and your imagination.

It's an incredible piece of technology, designed to maximize QuickTime's video capabilities. In fact, VideoSpigot and Tiger include QuickTime FREE. Tiger also includes Adobe Premiere, the industry's hot new video editing program — it's also FREE! Together, they create the perfect QuickTime starter package.

An Historic Leap: Apple QuickTime. Everyone's talking about QuickTime, the new way to communicate ideas. By adding QuickTime's capabilities to your Mac, you can capture videos (using VideoSpigot) with crisp, digital sound, and mix them with other clips and add them to documents like ordinary text files! Cut, copy, paste, and share video clips and movies easily with any application that supports QuickTime.

With Adobe Premiere, you mix audio and video together with sleek, graphical controls, ready for QuickTime to play in a window on your screen. Just gather the various clips together and quickly arrange them in the order you'd like them to play. You can combine anything: video footage, audio recordings, live sound, animation, still pictures, and graphic designs. Adobe Premiere enables you to add transitions, dissolves, page turns, spins, and more. Superimpose images in background clips and work with a palette of fascinating special effects. Create anything from a formal address to a music video. Use tints, filters, gradations, and more...

Present your best ideas — with motion and sound — right on your Mac.

Quickly cut and paste audio just like text, record edit and mix music, voices and effects. Modify sounds with echo, reverb, filtering and backwards. MacRecorder Sound System Pro is like having a professional recording studio in your Mac.

ADDITIONAL BONUS!

With Pro Bundle — SuperMac Tool Kit
The SuperMac Tool Kit contains an exciting, interactive video demonstration of one of the hottest developments in the Macintosh market today — QuickTime moviemaking with the VideoSpigot.



Capture video from your VHS or camcorder.

THE TIGER VIDEOSPIGOT PRO BUNDLE



VideoSpigot™ NuBus	\$699.00
Adobe Premiere™	\$695.00
Apple® QuickTime	\$169.00
MacRecorder®	\$349.00
Personna Micro Speakers	\$80.00
SuperMac CD Tool Kit	\$29.00

**A Complete Package Worth \$1,992!
NOW JUST \$699⁰⁰**

The Pro Studio Bundle includes MacRecorder® Sound System Pro and a pair of booming Personna Speakers, over \$1,990 in pro-quality audio/video hardware and software for just \$699!

MacRecorder® Sound System Pro enables you to record, edit, and playback live or recorded sound on your Mac. Includes built-in microphone and external microphone jack. Add soundtracks, special effects, and voice-overs to your presentations. The right effect, well-placed, can make the difference! Record and produce your own radio commercials... An unbelievable value!

VIDEOSPIGOT

BCJ2478A Mac IIsi Model	\$449.90
BCJ2478B Mac LC Model	\$379.90
BCJ2478F Mac II Family & Quadra™ (NuBus) ..	\$449.90
BCJ2991 The Pro Bundle	\$699.90

Includes the Complete Bundle Described Above.

VideoSpigot is a trademark of SuperMac, Inc.
QuickTime is a trademark of Apple Computer Corp.
Premiere is a registered trademark of Adobe.
MacRecorder is a registered trademark of Macromedia.



Adobe Premiere™	\$695.00
Apple® QuickTime	\$169.00

**A \$864 Value FREE!
With Every VideoSpigot**

Make Movies On Your Mac! VideoSpigot is easy to use... installs in seconds. In effect, you simply "pour" digital video into your Mac. Then cut, copy, and paste just like any Mac file.

In addition, your video productions can be seen over a network. Distribute movies over a LocalTalk®, Ethernet, or Token Ring network.



Publish-It's Desktop Publishing Challenge: Try It For Just \$99⁹⁰

REVIEWER'S NOTEBOOK: If you're about to enter the world of Macintosh desktop publishing, or if you're an experienced user who wants fast, pro-quality results without dredging through hundred-page-manuals, Publish-It! Easy is the award-winning, System-7 Savvy product that MacWorld magazine calls "... the Swiss Army Knife of desktop publishers". Now for a limited time, you'll be able to switch or upgrade to this 4-and-a-half mice rated package for only \$99.90 — if you currently own a desktop publisher or word processing program. This is a \$150 savings off the suggested retail price of \$249.95. Simply send us the title page of the DTP or word processing manual you are currently using, and you'll own Publish-It! Easy Version 2.1 for only



Now anyone can publish flyers, newsletters, invitations and more with incredible simplicity. This really lives up to its name: Publish-It! Easy.

\$99.90. Publish-It! Easy is also available in the new Corporate Network File Server Version.

The printed page. It can be an adversary or a joy. If you've got new Publish-It! Easy loaded on your Mac, you'll enjoy the process of laying out a page — and produce handsome newsletters, brochures, catalogs, reports, bulletins, advertisements, flyers, coupons and more! With the toolbox of advanced, easy-to-use features such as The Slide Show (complete with dozens of features and effects, outperforming some stand alone packages!), instant thumbnails (view and edit up to 100 pages), built-in database and mail merge, spell checker and thesaurus, your ideas will look extraordinary on paper as well as on-screen. Draw, paint, edit text, add graphics instantly and use a host of other state-of-the-art publishing tools with sleek controls. In fact, this one program eliminates the need and expense of having separate drawing, painting, word processing mail merge and presentation software — that's how incredibly full featured this package is! And don't worry — Publish-It! Easy doesn't punish you for mistakes or experimentation — it provides 5 levels of Undo to get you right back to the beginning, so you can explore other creative avenues. Print your quality pages on any Chooser-selectable printer.

Graphics From Scratch... You can also create your own graphics from scratch with 65 pen sizes, then paint them using an assortment of 32 brush sizes and an airbrush. For typographer-quality text effects, Publish-It! Easy allows you to mix typestyles, sizes and styles in any combination you like — even print grayscale or textured type to create an endless variety of unique effects. Of course, you get precise con-

trol of the kerning, leading, stretching, condensing and rotating of your type (in one-degree increments). Pop in a graphic image, and Publish-It! Easy automatically wraps text around it.

Includes FREE File-It Database... File-It is an incredibly useful database and merge program built right in to Publish-It! Easy. Now you can integrate customized information (names, addresses, phone numbers, personal notes, even entire paragraphs) into form letters you create in Publish-It! Easy. It includes three sample databases, seven professionally designed templates and an assortment of mailing label formats, so all you have to do is drop in your data and create a form letter in seconds! Preview your information before you print and retain all of the desktop publishing features (stylized fonts, rotated type, mixed text and graphics) when you create your customized documents. A powerful database takes care of all the details for you, like math, logical "if-then" functions, multiple sort levels and more. A great accessory to Publish-It! Easy that you won't find in other packages.

Corporate Network & CD-ROM Version Available!

PUBLISH-IT! EASY 2.1

BCJ2470 Publish-It! Easy 2.1	
(Try It) Full Retail Special	\$99.90
BCJ2470 Publish-It! Easy 2.1 Upgrade	\$99.90
BCJ2712 Publish-It! Easy 2.5 Network Pack (One Network File Server, One-Node Lan Pack, plus another One-Node Lan Pack FREE)	\$299.90
BCJ2719 Publish-It! CD	\$149.90
Any Macintosh running System 6.0 or later with 1MB RAM.	

The Radius Rockets Make Your MacII Faster Than A Quadra!

REVIEWER'S NOTEBOOK: Radius has always been on the lips of art directors, designers and studio producers who use Macs. For years, the creative community has turned to Radius to speed their work and enhance their creativity. As an authorized Radius dealer, Tiger presents The Rockets: advanced Motorola 68040 processing power at a new lower price.

The Radius Rocket Accelerators provide lightning quick speed for Mac page layout and publishing applications. The Rocket 25 straps on 25MHz processing capabilities and includes a math co-processor. The Rocket 25i is a more affordable accelerator, but without a math co-processor. Then there's the Rocket 33 — featuring the fiery rage of Motorola's 33MHz 68040 processor.

The Rocket 33 clocks in at over 32% faster than the Quadra 700 upgrade's 25MHz "040" (COMPARE VALUE! The Rocket 33 is over 32% faster than the Quadra 700 upgrade and is hundreds of dollars less!) The Rocket 33 is the right board for 3-D modeling, popular animation applications, publishing and image processing programs.

RADIUS ROCKETS

BCJ2780 Rocket 25 Accelerator	\$1799.00
BCJ2781 Rocket 25i Accelerator	\$1349.00
BCJ2782 Rocket 33 Accelerator	\$2199.00

Buy A Color Pivot, Get A \$599 Color Display Card Free!

REVIEWER'S NOTEBOOK: The revolutionary Radius Color Pivot Display is the only monitor that works the way you do — in both portrait and landscape modes. See a full page without scrolling. A spectacular value! And for a limited time, Tiger will throw in the Color Pivot video interface card, a \$599 value — FREE!

The immortal Radius Color Pivot. The only monitor in the world that can display a full page in color and pivot to display a full page landscape too! Ask a pro how much easier that makes his life. Now your Mac can have this freedom.

The Color Pivot is perfect for design professionals and advanced desktop publishers, but it's also an ideal upgrade for everyday use, especially if you're "in and out" of a variety of applications. Just pivot to see as much of the screen as you need. And it is an excellent value. Consider this — the only other way to see a full page in actual size without scrolling would be to buy a 19" or larger display — many hundreds of dollars more than the Color Pivot!

Team the Color Pivot up with a Radius video interface and you get an unbeatable duo. 256 vibrant colors on any Mac LC, SE/30, IIsi and all NuBus Macs.

So, if you need a color display solution, you can spend \$2298 on a landscape display system from Apple. Or for only \$879,



buy the Color Pivot, and get both a portrait and landscape display in one for about \$1419 less. How's that for value?

RADIUS COLOR PIVOT

BCJ2784A Color Pivot LE Monitor	\$879.00
BCJ2784B Display Card for SE/30 Models (\$599 Value)	FREE
BCJ2784C Display Card for Si Models (\$599 Value)	FREE
BCJ2784D Display Card for Mac II Family & Quadra (NuBus)	FREE
BCJ2784E Display Card for LC Models	FREE

Your Color Pivot LE includes a FREE interface card. Please specify your Macintosh model when placing your order so we may ship you the appropriate interface card.

Returns for exchange only.

Link PowerBooks To Large Color Displays!

REVIEWER'S NOTEBOOK: For PowerBook users who want a clean, crisp connection to external color displays, the Radius PowerView is the perfect instrument. Lightweight, small and built to survive an airport cargo crew, the PowerView displays up to 256 colors and plugs into your SCSI port.

A must for PowerBook users on the run. PowerView is an external color display interface for 140 and 170 'Books. Just plug it into the PowerBook's SCSI and you're ready to go.

RADIUS POWERVIEW

BCJ2783 PowerView Interface	\$535.00
-----------------------------	----------

Returns for exchange only.

High-Quality Video Directly From Your Mac!

REVIEWER'S NOTEBOOK: This one amazing board add a new dimension to multimedia. This new technological leap turns your Mac into a video editing workstation. Full-motion video in from any VCR — full-motion video out. Integrate high-quality audio, video and graphics and output them to videotape, playable on any VCR — with absolutely NO flicker!

RADIUS VIDEOVISION

BCJ2921 VideoVision	\$2219.00
---------------------	-----------

Adobe Illustrator, Streamline And ATM: Just \$399.

ADOBE ILLUSTRATOR: A slew of impressive industry awards grace the Illustrator box, a clue to the amazing capabilities you'll discover inside. Indeed, Adobe Illustrator is the most powerful drawing, page design and production tool in the world today, ideal for designers with a desire to elevate their work to a new vista of speed and creativity. It's the only system capable of precise illustrations, extensive text handling, fully automatic graphing and color separations. You can work from existing images if you like — just scan it and you're ready to begin. Or draw from scratch using Illustrator's magnificent set of drawing tools, the envy of the industry. It's as simple as moving the mouse.

Professional pages depend on the ability to handle text in a variety of ways. (This package includes free Adobe Type Manager and 13 type faces). Nothing allows more creative opportunities than Adobe Illustrator when it comes to integrating text with your designs, illustrations, line art, images and photos. Just enter your text on screen, or quickly import it from your word processor.

Create tight wraps around shapes (or any path, like circular type) and images, viewing your alterations on your screen as you work. Flow text between columns, add unlimited numbers of characters and styles from any PostScript Type 1 font (including the entire Adobe Type Library). You can even convert the type to outline images and then edit them.

Creating charts is a snap with Illustrator. Just type in your data, select a chart type and it's done. Customize your charts with your palette of creativity and revise them in just a few seconds. You'll create top-notch ads, brochures and more, from concept to final production and color separations. In fact, the Adobe Illustrator box was completely created using the product. Color capabilities include smooth 24-bit screen reproduction (8-bit is supported for B&W).

ADOBE STREAMLINE. Producing high-quality PostScript artwork on a Macintosh has never been easier — provided you have the right tools. Adobe Streamline software is one of those tools. In fact, it's the easiest way to guarantee you'll always have PostScript quality, no matter how you start.

The Adobe Streamline software is a computer graphics tool that literally *streamlines* the production process by converting high-resolution bitmapped images (from existing files, scanned black and white line art, or continuous-tone images) into Encapsulated PostScript, PICT, DXF or Adobe Illustrator files. You can convert one image at a time, or quickly convert an entire folder of images in batch mode.

Once you've converted the images, you may use them as-is, export them to your favorite page layout program, or modify them in a drawing program such as Adobe Illustrator — saving you hours of tracing and copying by hand. That's why Adobe Streamline is the perfect tool for technical illustrators, desktop publishers and graphic artists.



Great illustrations with precise details.



Incredible typographic illustrations are fast...



ADOBE EXCLUSIVE BUNDLE
ILLUSTRATOR TYPE MANAGER AND STREAMLINE 2.0

HERE'S WHAT YOU GET
ADOBE EXCLUSIVE BUNDLE

Illustrator	\$595.00
Streamline 2.0	\$195.00
Type Manager	\$99.00

A GRAPHICS BUNDLE WORTH \$889
For Just \$399

ADOBE
BCJ2960 **Illustrator** with
Streamline 2.0 and Type Manager . . . **\$399.00**
Mac with hard disk; minimum 2MB RAM for System 6.0.5 or greater — 4MB RAM for System 7.

ADOBE PREMIERE 2.0! UPGRADE NOW FOR: JUST \$149

REVIEWER'S NOTEBOOK: In addition to the two industry standards reviewed on this page: Adobe Illustrator and Adobe Streamline, TigerSoftware is proud to be among the first to offer new Adobe Premiere Version 2.0, an incredible new title that allows you to combine video footage, audio, animation, still images and graphics to produce digital movies on your Mac. Uses Apple's QuickTime media-integration technology, so multi-unit production hardware isn't required. Adobe Premiere is fast, fun and yields high-quality results. Interactive presentations, television ad concepts and roughs, video databases, merchandising sequences and training sessions are just a few of the wide-ranging uses for this hot new title.

Become a movie maker — with the help of your Mac — and new Adobe Premiere. It's the newest creative tool from the leaders in precision graphics and photo manipulation. It's fast, easy and fun to



use — just gather your clips and arrange them in the order you want them to play and Premiere handles the rest with blazing speed.

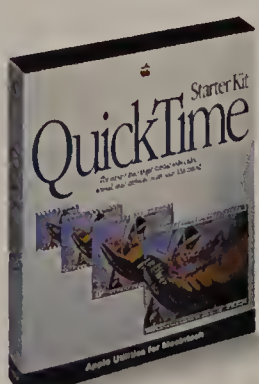
Premiere utilizes the Apple QuickTime extensions to store and import your video and audio files. You can arrange your clips to appear in progression with simple cuts, or overlap them to create dramatic transitions like dissolves, page turns and spins. You can isolate areas of your moving video or still images and superimpose them onto other clips to create a wide range of special effects that will grab your audience like nothing else they've ever seen.

You can use plug-in filters (including Adobe Photoshop-compatible filters) to produce tints, distortions and replications. Using Apple's QuickTime extensions, you get the enormous capabilities of true media integration — and now, you can produce digital movies at an affordable price, for a variety of uses. And with QuickTime, you can store video footage and accompanying audio on an ordinary disk drive.

Premiere acts as the control

room for your movie studio. From its intuitive interface, you'll see the tracks of your movie in "filmstrip" style. And if you need to make a change, multiple windows provide you with fast access to any editing function. Want to add an effect? Just click any one of

the animated icons to select great digital effects. The video windows on your screen also enable a quick preview of source material, digital effects and assembled video. There's even a Timeline display with zoom-in and single-frame viewing. Quickly check your sequences with Premiere's push-button controls, move to any clip instantly.



FREE QUICKTIME INCLUDED—A \$169 VALUE

NEW ADOBE PREMIERE 2.0
BCJ2961 **Premiere 2.0 Upgrade** **\$149.00**
BCJ2962 **Premiere 2.0 Retail** **\$499.00**
Mac II family computer; 4MB RAM; high-capacity hard drive (80 MB or more); System 6.0.7 or greater; 32-bit QuickDraw 1.2 or greater.
Restrictions apply to upgrade. Call for details. While supplies last.

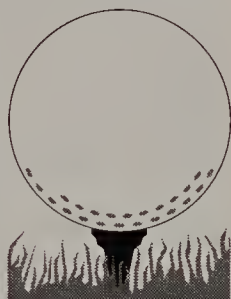
263 Display Typefaces And 100 EPS Borders: \$99⁹⁵

REVIEWER'S NOTEBOOK: *What's wrong here? Was that a typo in the headline or has Tiger Software lost their minds? No typo. No mind loss. Just a great value on a complete (and we mean complete!) library of 250 Type 1 or TrueType display faces for use with any application that supports PostScript or TrueType — and that means just about every Mac application known. Includes screen fonts as well as printer fonts. Why pay more for foundry-quality type? Especially when you get these great collections of Ed Benguiat headlines and EPS borders free?*

Display typefaces — designed to attract attention to whatever you have to say. Take advantage of FontBank's staggering array of quality fonts at down-to-earth prices. 263 display typefaces and 100 EPS borders for just \$99.95!

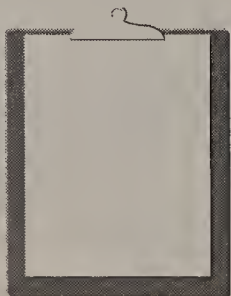


You'll create attention grabbing documents and eye stabbing graphic elements for any graphics program and desktop publishers. With such a wide variety of faces available to you, creating incredible headlines is fact, fun and amazingly professional. The headline is the face of good advertisements. Wimpy headlines are usually ignored, while bold headlines attract the reader, and if your message is important, the casual reader becomes curious — and persuaded. Remember, though, that headlines must be legible. If you'd like to know more about working with display faces and creating winning headlines, call TigerSoftware and ask for a free copy of a 24-page book that we've prepared entitled "A Short Course On Working With Type." It has been prepared by the typographers at Tiger and we'd be happy to get one in the mail to you.

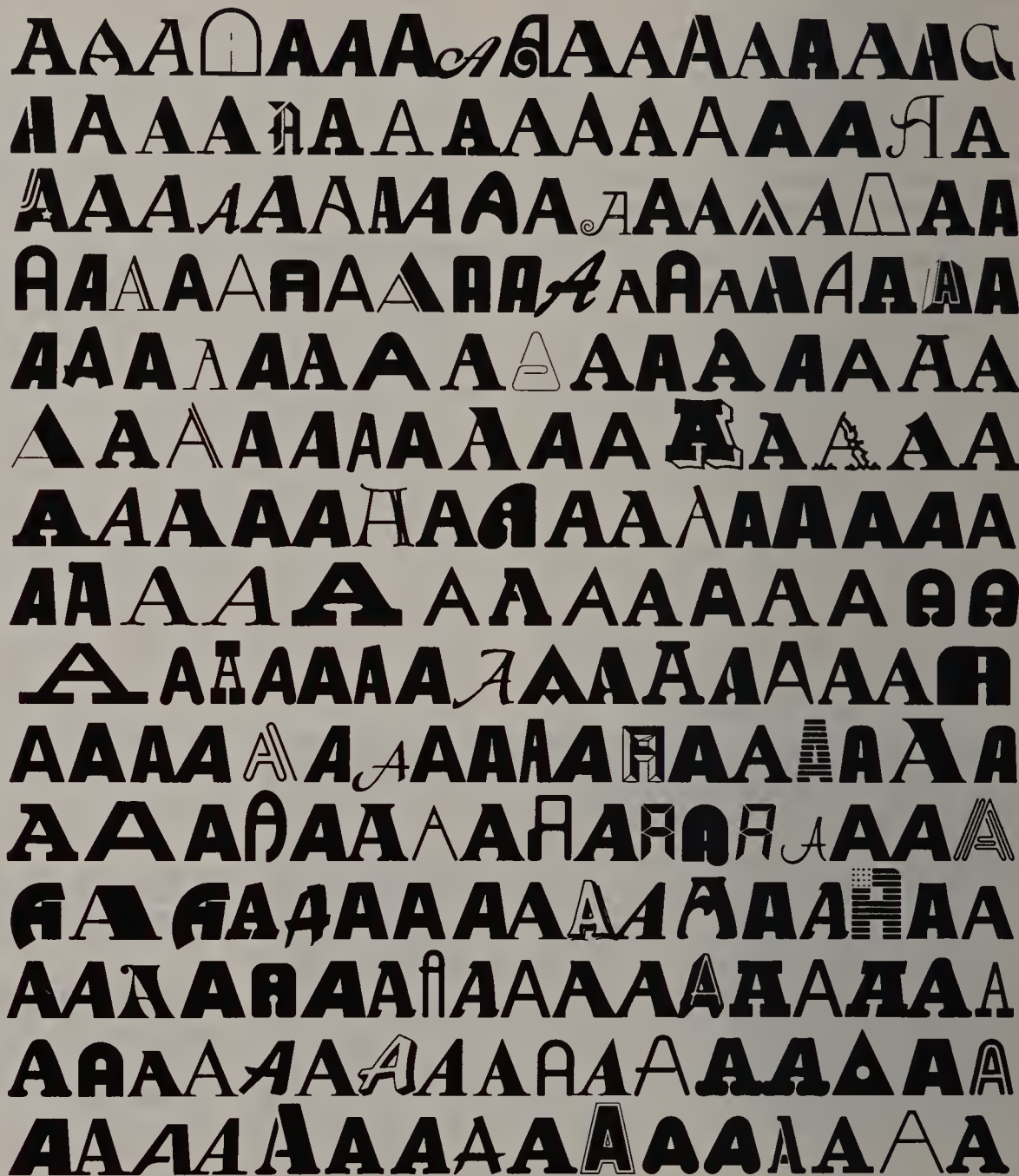


FontBank has assembled a vast array of looks and feels in their type library. 250 different faces, each with its own distinct character. Some you may never have seen before. Combining FontBank's 250 faces with the capabilities of these programs offers the opportunity for an unlimited number of special effects. And FontBank display faces are compatible with all major page layout applications like QuarkXpress, PageMaker, Illustrator, FreeHand and ATM.

Regardless of what the design assignment, from flyers, posters, ads, coupons and greeting cards, to presentations, notices, memos and packaging, FontBank display typefaces give you the typographic tools you need to look your creative best. And, when converted to editable outlines using Illustrator, FreeHand or PageMaker 3.0, these faces can be used to produce special text and design effects to create stunning documents.



How long have you been using the same tired



typefaces? Chances are, you use what you have because finding the right typefaces, installing them and learning to use them is more trouble than it's worth. so you compromise the overall look of your document by compromising on the one critical factor: the type. That's why FontBank is such an exciting product, easy to install, a pleasure to use — and a low cost way to improve the quality of everything you print.

Borders Complete Your Layout. Often the only thing between you and an attention getting layout is the lack of some visual ornament to pull it all together. Usually the answer is a border. But how many of us have the time to draw a border as the clock moves ever closer to the deadline hour?

Recognizing that need, FontBank has introduced BorderBank, a collection of 100 imaginative, attention-arresting borders in EPS (Encapsulated PostScript) format.

It's yours free when you order the Fontank Type Companion.

Designed by DTP guru T. Craig Smith, the BorderBank collection is an ideally quick and simple way to add a border to your ad, coupon, sidebar or just to pull your whole layout together.

The designs run the gamut from the traditional to cutting-edge contemporary. And using them is as simple as placing any graphic within your page layout or drawing program. Since they're EPS graphics, they proportion perfectly to whatever area you assign them to.

And they're yours free when you purchase the FontBank type Companion.

Total Design Power. There you have it. For \$99.95, you can buy the FontBank Type Companion with its 250 display typefaces — and get 100 EPS borders designed by T. Craig Smith FREE! And with a little imagination you'll be creating layouts that make people do what you want them to do.

FREE!
100 EPS BORDERS

\$149
VALUE

No question about it: borders add excitement to your layouts. Order the FontBank Type Companion and get the collection of 100 EPS borders designed by DTP guru T. Craig Smith FREE! They are compatible with all page layout and most drawing programs.

Tiger Special Offer

FREE! Send in your FontBank registration card and get these 13 Photo-Lettering, Inc. Faces FREE! Chosen and edited by world renowned type designer Ed Benguiat. Also available separately for \$9.95.

FONTBANK

BCJ2425 FontBank MAC

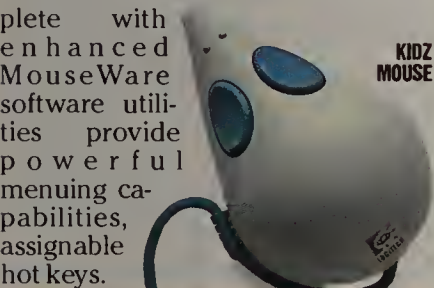
With Free BorderBank \$99.95

Call for details.

MOUSEMAN/KIDZ MOUSE

Logitech MouseMan is not just another mouse. It is the most sophisticated pointing device in the industry today, featuring three fully programmable buttons, sleek ergonomic design and the highest quality craftsmanship. MouseMan's 400 dpi hardware resolution makes the most efficient use of your desk space and it plugs right into your mouse port.

Logitech has been concentrating on creating the perfect desktop mouse since 1984, and today they're the largest manufacturer of pointing devices and scanners in the business. If you think all mice are the same — you haven't seen a Logitech MouseMan. MouseMan comes complete with enhanced MouseWare software utilities provide powerful menuing capabilities, assignable hot keys.



LOGITECH MOUSEMAN
BCJ2200 MouseMan for Mac . . \$79.90
BCJ2589 Kidz Mouse \$49.90

TRACKMAN

The Stationary Mouse of the 21st Century! The most advanced design, the most precise movement — perfect for limited-space desktops. The ultra-ergonomic shape comfortably accommodates your hand for sleek, swift movement. It's from Logitech.

Perfectly engineered for your hand, TrackMan allows your fingers to rest on the buttons as your thumb controls the ball. Highly precise, extremely comfortable — and smart as a whip.

If you work with graphics and page layout software, TrackMan is the ideal instrument; it lets you get right in there and tweak pixels, clean up photos and artwork, perform detailed stripping and color manipulation. TrackMan eliminates the "shifting" that occurs in other instruments.



LOGITECH TRACKMAN
BCJ2210 TrackMan for Mac . \$89.90

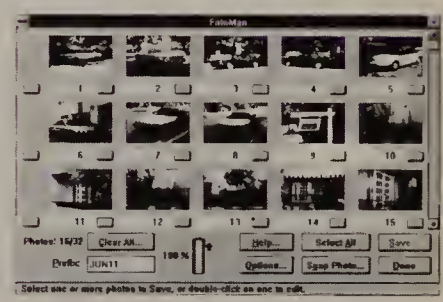
FOTOMAN COMPUTER CAMERA

What is it? In short, it's a portable, digital camera — for your computer. Logitech FotoMan takes great pictures with a amazing clarity and 256 grayscale richness — then allows you to instantly download them to your Mac. It includes a slew of image editing tools that open a world of creative opportunity, and is compatible with virtually all desktop publishing programs. The applications for this new technology are enormous. Insurance and real estate professionals are using it to expedite claims and transmit photographs of neighborhoods and homes. Manufacturers use FotoMan to quickly catalog products and parts, while law enforcement officials are using it to photograph suspects, crime scenes and evidence — without the time and expense of film, processing and prints. Digital images are instantly captured and merged into documents, or stored as a permanent record. Up to 32 images can be shot and stored on the FotoMan's RAM chip, then transferred via serial port to FotoTouch or previewed on your screen.



One of the hottest new ideas in computing: the digital photograph — taken by a small, portable and easy to use camera that allows instant transfer to your computer — without a buying any other hardware.

INCLUDED FREE!
DIGITAL DARKROOM 2.0
Perform amazing editing feats on scale images with Digital Darkroom 2.0. It now supports image, scanner, and printer calibration.
A \$395 Value FREE



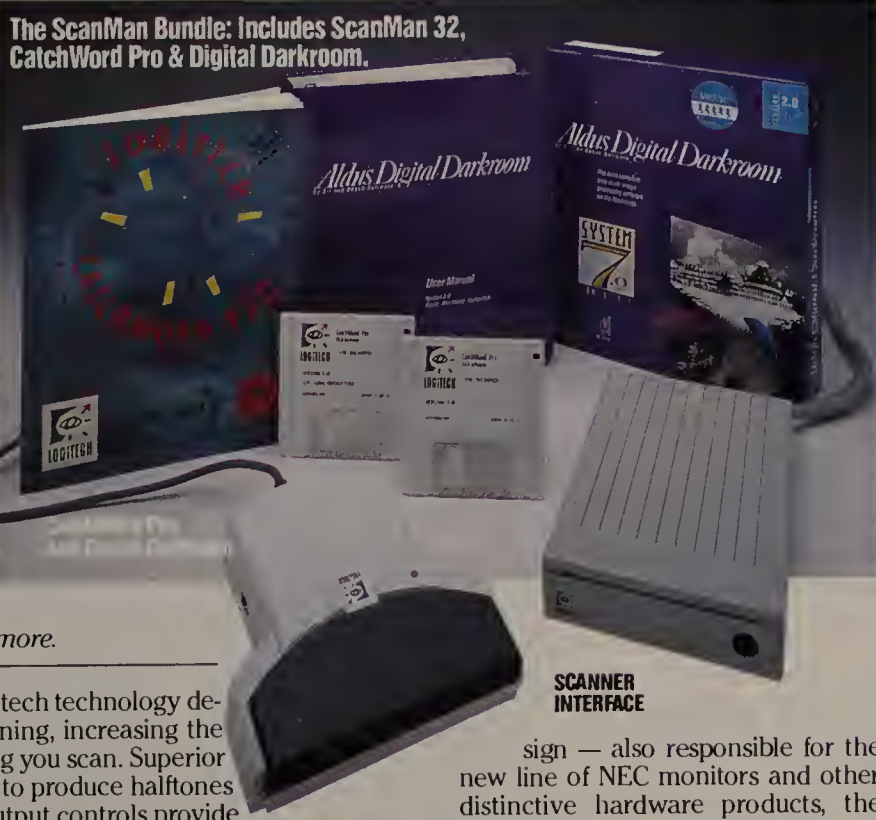
LOGITECH FOTOMAN
BCJ2585 MAC FotoMan with Free Aldus Digital Darkroom . . \$649.00
Call for system requirements.

SCANMAN 32

WITH DIGITAL DARKROOM AND CATCHWORD PRO: ALL THREE JUST \$399

REVIEWER'S NOTEBOOK:
The ScanMan Bundle begins with the instrument itself: the Logitech ScanMan 32 grayscale scanner. It's a marvel, packed with technical innovations and crafted into a rugged, ergonomic housing. The scans? Crisp. Clean. Perfect...

We put the ScanMan 32 hand scanner through it's paces, performing over 50 scans of various black and white images — photos, line art, logos, type, illustrations — even poor-quality photos. The ScanMan 32 features 32 gray scale performance. Use scanned images in word processors, multi-media, desktop publishing, HyperCard, OCR and more.



The ScanMan Bundle: Includes ScanMan 32, CatchWord Pro & Digital Darkroom.

The Science of Scanning. Logitech technology destroys the old barriers of scanning, increasing the speed and accuracy of anything you scan. Superior image quality, with the ability to produce halftones for reproduction. The set of output controls provide the best possible results on any printer or monitor screen. Its 4" wide scanning area allows full-page scans with just two quick passes.

The instrument itself is a masterpiece. From the genius of the respected industrial design firm, Frogde-

sign — also responsible for the new line of NEC monitors and other distinctive hardware products, the ScanMan 32 is magnificent.

CatchWord Pro Included FREE! CatchWord Pro delivers powerful Optical Character Recognition (OCR) software that captures printed, hard-copy data by scanning it, rather than typing it.



Incredible grayscale images right on your screen!

CatchWord Pro delivers an amazing 99% accuracy in OCR testing, used in tandem with the ScanMan 32. It's compatible with popular word processors, spreadsheets, databases and desktop publishers — so you can scan information directly into your application and use it immediately!

Digital Darkroom Included FREE! Digital Darkroom from Aldus is the most complete grayscale image processing software for retouching, enhancing, composing, and modifying scanned photographs and other bitmapped graphics on the Macintosh.

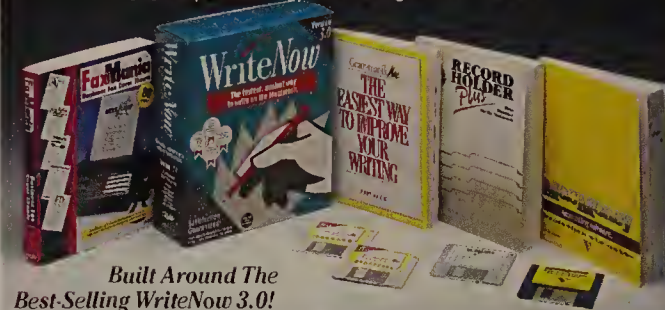
THE SCANMAN 32 BUNDLE
ScanMan 32 with
CatchWord Pro \$599.00
Aldus Digital Darkroom \$395.00
**A Scanner Package Worth \$994.00
FOR JUST \$399**
BCJ2977 ScanMan 32 Bundle with
FREE CatchWord Pro &
Digital Darkroom \$399.00
Call for system requirements.

The WriteNow Hot-Pack!

REVIEWER'S NOTEBOOK: WriteNow is the word processor Mac aficionados swear by — it's fast, compact (requires just 325K), reliable, and brimming with great new features that give every document that you create an absolutely stunning look. NEW! Paragraph and character style sheets help you create a clean, consistent look. NEW! An incredible print preview that displays thumbnails and facing pages — optimized for your particular screen's size. NEW! Color text and graphics, along with new styles and graphics capabilities. NEW! One-step default document creation — just throw in the text and out comes a masterpiece.

If you're a Word user, just try WriteNow 3.0 and see what you're missing. From page layout and design, graphics and document management to printing, System 7 support and great style sheets. It just feels so nice. The columns snap to attention as you enter text, the headers and footers pop into exact po-

ALL THIS FOR \$99.90 — The sleekest word processor, best-selling Grammar Checker, Accounting, Data Manager & Fax Software!

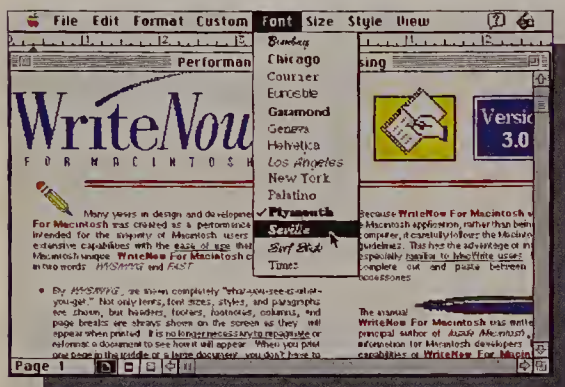


Built Around The
Best-Selling WriteNow 3.0!

sition, the formatting and style sheets are crisp and professional — and WriteNow contains a giant 1.4 million-entry thesaurus, a 135,000 word spelling dictionary with ultra-convenient Auto-Find and Auto-Guess spell checking. WriteNow is compatible with other leading applications such as Microsoft Word, Works, MacWrite and WordPerfect (For DOS). There's more new stuff: lightning-fast scrolling for easy movement throughout your documents, unlimited paragraph and graphic sizes, triple-click paragraph selection, style sheet design templates, virus alert and more.

The Lean And Mean Word Processor. WriteNow has swept the industry, collecting Editor's Choice awards and other top honors. Known for its incredibly swift performance and compact size. But despite the lack of size, WriteNow contains a complete set of state-of-the-art features. Everything you need is here — with powerful new page design features (that you'll actually use) to create great looking letters, memos, reports, presentation handouts and more. The print quality is excellent.

Great Looking Print Preview! The print preview is remarkable, featuring optimized thumbnails, multiple page viewing, facing pages (reader spreads), and speedy magnification.



WriteNow is perfect for everyday letters, memos and reports. Easy-to-understand menus are the key.

ONLY FROM TIGER!

THE WriteNow "HOT-PACK" Bundle!

Only Tiger can assemble a sizzling offer like this! Award-winning WriteNow 3.0 is joined by four great software titles — each best-sellers in their own right. First, you get Fax Mania — it includes scores of high-quality, professionally designed fax cover sheet templates. There's one for every mood, event, occasion and situation. From formal to freaked-out! — it's a \$39.95 value. Then there's Grammatik, the trusted grammar and style checker that gives your writing clarity and power. Easy to learn and use, you'll notice an improvement the first time you use it — a \$99 value.

Record Holder Plus is the sleek, simple-to-use data manager than enables you to organize, store, retrieve and report information. It's a snap to put your information to work; let Record Holder Plus take care of it — a \$145 value. To round out the Hot-Pack Bundle, we've included MacMoney, the fast, easy — yet extremely powerful accounting program specifically designed for the needs of home and small business. Point-and-click operation makes organizing your finances a breeze. Includes excellent reporting features and zippy data entry.

The WriteNow Upgrade

HOT-PACK BUNDLE

WriteNow 3.0	\$249.00
Mac Money	\$119.95
Record Holder Plus	\$145.00
FaxMania	\$39.95
Grammatik Mac	\$99.00

**A Software Bundle Worth \$652.90!
NOW JUST \$99.90**

WRITENOW

BCJ2966 WriteNow 3.0 Upgrade "Hot-Pack" Bundle	\$99.90
---	---------

THE NEW 256K SHARP WIZARD!

REVIEWER'S NOTEBOOK: Imagine a 256K device the size of an ordinary checkbook. The new Sharp Wizard packs a powerful whallop, enabling you to organize more information faster and easier with the help of its amazing built-in functions.

It wasn't so long ago when 256K was the accepted memory standard in the computer industry. Now you can slip it into your briefcase...

Only Sharp could have brought such an impressive technological achievement to the world. The Wizard OZ-8600 features an extra large, high-contrast display that measures a whopping 40 characters wide by 8 lines deep. There are 10 built-in functions (all superbly integrated): A Scheduler (with alarm), a To-Do List, 3 different Calendar Views, 3 Phone/Address Books, a Business Card File, Memo Pad, Outliner, Home and World Time Clocks and Calculator with paperless printer.

The OZ-8600 also features helpful on-screen instructions and can easily store over 5,500 names and numbers or over 3,800 scheduled appointments!



With more than 25 optional software cards available, the OZ-8600 becomes everything from a travel planner to a financial assistant to an arcade. With the optional interface and transfer cable, this tiny hellcat will exchange information with your desktop applications. Communicate with Macs or send faxes with the optional modem.

All of which makes the new Sharp 256K Wizard the perfect partner.

Organizer Accessories There's an optional modem, printer, fax and a slew of software cards that turn the Wizard into a fully functioning office.

Expand The Sharp's Mind When you add software and memory cards to your Wizard, you put all kinds of possibilities at your fingertips.

Time Expense Management A must software add-on for the Wizard. The powerful way to manage and prioritize your schedule, track your expenses and

deadlines, and account for time spent on projects or client meetings.

Spreadsheet Create fully functional, Lotus 1-2-3 file compatible, 26-column-by-999-row spreadsheets on your Wizard, or download a spreadsheet from your Mac! This card will hold 64K of data! Built-in features include: 10 templates, complete formatting, sorting and "freezing pane" functions, and financial calculations, spreadsheet-linking capabilities, cut & paste.

NEW Spanish/English Dictionary Just Released! The fast, handy Spanish/English translation software for use with your Wizard.

SHARP WIZARD

BCJ6310 ZQ-5200 Sharp Organizer	\$179.00
BCJ6306 OZ-7620 Sharp Wizard	\$229.90
BCJ6312 OZ-8000 Sharp Wizard 64K	\$279.00
BCJ6309 OZ-8200 Sharp Wizard	\$339.00
BCJ6307 OZ-8600 Sharp Wizard	\$449.00
BCJ6313 Organizer Modem	\$139.00
BCJ6314 Organizer Talker (7000 Series Only)	\$85.00
BCJ6315 Organizer Fax Modem	\$389.00
BCJ6320 Time Expense Management	\$89.00
BCJ6321 Dictionary/Thesaurus	\$99.00
BCJ6355 American Heritage Dictionary	\$156.00
BCJ6322 8 Language Translator	\$75.00
BCJ6323 Money Planner	\$75.00
BCJ6324 Spreadsheet	\$139.00
BCJ6330 Box Jockey	\$39.00
BCJ6331 Organizer Chess	\$85.00
BCJ6332 Tetris Game (7000 Series Only)	\$39.00
BCJ6333 Organizer Bible	\$117.00
BCJ6340 Portfolio Card	\$99.00
BCJ6341 32K RAM Card	\$59.00
BCJ6342 64K RAM Card	\$99.00
BCJ6345 128K RAM Card	\$119.00
7000-8000 Series Only	
BCJ6347 IBM Organizer Link II	\$99.00
BCJ6348 NEW Macintosh Organizer Link II	\$85.00
BCJ6352 Battery Pack (for 8000 Series)	\$26.00
BCJ6353 Printer	\$119.00
BCJ6354 Dubbing Cable	\$24.95
BCJ6356 NEW Spanish/English Dictionary	\$99.00
BCJ6357 Backgammon	\$69.99
BCJ6358 Hatris	\$49.99

Returns for exchange only



LEARN TO PLAY THE PIANO IN 30 DAYS!

REVIEWER'S NOTEBOOK: It seems like everyone is talking about the Miracle Piano Teaching System. It's been featured on "Good Morning America," "The Today Show" and "The Arsenio Hall Show." It's been written about in Newsweek and The New York Times. It's become popular because it really works — anyone, at any age — can learn to play piano and achieve musical literacy in just a very short time. More importantly, they can learn at their own speed, without formal lessons — by connecting the Miracle to their Mac.

So how does it work? It's actually very simple. The Miracle software contains game-like exercises that make learning fun. Like the shooting range that knocks off ducks when you hit the right notes. You'll



learn to play chords as parachutists jump out of a plane and learn melodies by repeating back what the Miracle plays. It's so much fun that you'll actually forget that you're learning. The next thing you know, you'll be playing your favorite songs. The Miracle provides instant feedback as you go, recognizing problem areas and bringing up specific drills to help you get it right. If you're struggling in a certain area, The Miracle continues to provide arcade-like lessons in that area until you get it right. It's not boring, tedious labor — it's actually fun. And that means faster learning and visible progress.

When you've mastered a specific skill, The Miracle quickly moves on to the next level, with new games, vivid new screens and new musical concepts.

If you love music, and always wanted to play the piano — here's your chance. And it's never too late to learn with The Miracle, adults learn as quickly as children because they work at their own speed, building on skills quickly — on their own schedule. It's the power of your computer at work in an important role: learning.

TigerSoftware sweetens The Miracle's charms with a bundle that's simply unbeatable. You get the Miracle keyboard, software — plus the Miracle Song Collection so you can play along with your favorites from The Beatles, Michael Jackson, Buddy Holly, Lionel Richie, George Michael and more. We'll also include the Miracle Keyboard stand, stereo headphones and a copy of TRAX, the advanced MIDI recording software that transforms your computer into a multi-track recording studio. With TRAX, you

can record and mix multiple tracks, add additional instruments and effects, add vocals, change the tempo—and do it all from your keyboard. Record up to 64 tracks with a host of tape recorder-like controls. Compose and edit your own tunes by just cutting and pasting notes on your screen. TRAX is simple to use and delivers professional results.

It's everything we could possibly think of to complement the Miracle's amazing capabilities. And it's all free from Tiger with The Miracle all for just \$379.00.

The joy of making music... now you can experience that thrill with the Miracle Piano Teaching System, the world's most advanced multimedia training system.

The Only Self-Teaching Piano. The Miracle Piano Teaching System can teach anyone — child or adult — to play the piano with a series of progressive, customized lessons. The Miracle quickly connects to a Macintosh and includes software cartridge that combines an advanced MIDI keyboard with full-stereo sound and brilliant on-screen graphics. In no time at all, students of all ages will learn and perform left and right handed melodies — while having a lot of fun!

There are exercises, musical pieces and drills (cleverly disguised as games), that teach hand positions, notes, fingering, rhythm, scales and more. The Miracle can be quickly set up for any age or expertise, and customizes itself to move the user along at a comfortable pace.

Unlike conventional piano lessons, The Miracle eliminates boring, repetitive routines. The super-creative, artificially intelligent software quickly teaches the basics and builds on them in very entertaining ways. And that makes all the difference.

The Keyboard. Dazzling music! Spectacular effects! Booming orchestras — all created by you and the Miracle keyboard. As a stand alone instrument, The Miracle rivals the music industry's most sophisticated MIDI consoles. The 49 full-size keys are velocity sensitive, so you can learn to play utilizing true piano expression. You also get a foot pedal, which controls the length of time each note is sustained and stereo earphones.

Here's What You Get Free With The Miracle — Only From TigerSoftware. When you buy a Miracle from TigerSoftware, we'll throw in everything you need to create your own recording studio. We'll start with the Miracle Song Collection Volume 1, containing dozens of popular songs from the Beatles, to Michael Jackson. Play along with your favorite songs, or break out into your own solo. These song collections are a great value and are yours free only from Tiger.

Then we add a copy of TRAX, the MIDI recording software that allows you to create your own smash hits. Change the tempo,



As Seen On
"Good Morning
America," "Today
Show" and
Arsenio Hall!

mix different instruments, add your own vocals, sound effects and more — controlling it all from your keyboard. The TRAX interface is simple and fast, enabling you to lay down tracks using your Miracle to create your own arrangements.

But That's Not All. You also get the Miracle keyboard stand. With all this, you'll be ready to create your own live performance or cut your own record.

With The Miracle, you or your child can learn to play without the boring drills and monotonous practice that music usually requires.

So not only do you enjoy the benefits of the world's most exciting piano teaching system, with The Miracle Song Collection, you get an educational jukebox with 40 more ways to play to learn instead of just learning to play.

Song Collection Volume 1. All Night Long (Lionel Richie); Another Part of Me (Michael Jackson); Bad (Michael Jackson); Billie Jean (Michael Jackson); Born To Be Wild (Mars Bonfire); Careless Whisper (Andrew Ridgley, George Michael); Celebration (Kool and the Gang); Could It Be I'm Falling In Love (Melvin Steals, Mervin Steals); Do You Want To Dance (Gene McFadden, John Whitehead); Dreams (Stevie Nicks); Everyday People (Sylvester Stewart); Forty-Second Street (Al Dubin, Harry Warren), and more...

THE TIGER MIRACLE PIANO SUPER BUNDLE

Miracle Piano Teaching System	\$347.00
Miracle Stand Shown Above	\$35.00
Miracle Song Collection	\$49.95
Trax MIDI Studio Software	\$100.00
Trax Song Collection	\$29.00

**A Music Package Worth \$560!
NOW JUST \$379⁰⁰**

Tiger's Miracle Piano Super Bundie

BCJ2778 Tiger's Miracle Piano Super Bundle	\$379.00
Includes Miracle Piano Teaching System Worth	\$347.00
Miracle Stand Shown Above Worth	\$35.00
Miracle Song Collection Worth	\$49.95
Trax MIDI Studio Software Worth	\$100.00
Trax Song Collection Worth	\$29.00
Total Value \$560 On Special For Only \$379	

The Miracle Piano Teaching System

BCJ2970 Miracle Piano Teaching System	\$347.00
BCJ3781 K-5 Carrying Case	\$39.95
BCJ2792 Song Collection 2	\$39.95

Available for Macintosh, Nintendo, And DOS.
Call For Other Models.



THE CD-ROM SHOWCASE

Make a grand entrance into the amazing world of Wayzata CD-ROMs — or expand your library with selections from Tiger's collection of best-selling current releases. Dozens of new packages are available each week, so call us for late-breaking CD titles.

Quick Art Deluxe. Look out! Here comes a truckload of professionally drawn, top-quality images! Over 3000 in all, with 300 dpi crispness and available in TIFF format. Great desktop publishing companion — the only art library you'll ever need, on one CD-ROM! Includes a paper catalog to identify images. You get (in addition to topics listed above in Quick Art Lite) birds, buildings, education, fish, gardening, medicine, music, mystery, weather and thousands more!

EPS Professional Vol. 1. The definitive collection of CD-ROM graphic design. Includes an incredible 800 fully resizable, Encapsulated PostScript images. From the graphic design studios of Christopher Marshall Designs (CMD) and LasArt, EPS Professional contains design elements for T-shirts, alphabetic designs, four-color pieces, covers and backgrounds. Supports PostScript laser printers, imagesetters and other high-end output devices.

Space Time & Art. 300 fascinating 24-bit color images on the subject of space. Great disc — hours of explor-

ing is in store for you — see NASA views of space and photos from Voyager missions along with a collection of astonishing original images by Josepha Haveman.

Font Fun House. Hundreds of fonts, ready to use! Shareware and freeware fonts that capture any mood or make any statement. Go crazy with all kinds of faces from elegant to outrageous! Also includes screen font libraries from AGFA and Adobe. This is a great collection, and a must-disc for desktop publishers. If you can't get enough fonts, then Font Fun House is for you.

Ocean In Motion. A fascinating collection of enchanting coastal clips in QuickTime from artist/photographer Josepha Haveman. Over 200 QuickTime movie sequences of the thunderous beauty of the place where the ocean meets the land. Includes 60 still clips for fast, easy editing. Use these movie clips for backgrounds, presentations, intermissions or just savor the power of the sea on your screen.

MACnificent 7 Education & Games. Brimming with over 280 megabytes of System 7 games and educational shareware! Contains unique "Librarian" which provides instant information about what's in those 280 megabytes. Includes over 800 games, over 400 educational programs, over 50 free demos, over 1500 games support files, over 150 sounds & sound stacks — over 5000 files in all! The best bet for children...

Winning Elections. Interested in political office? This is the perfect source for everything you'll need to know to get elected. Assembled from a number of reference works on the subject of political campaigns, Winning Elections also provides insight into the our process of government, how campaigns are funded and more.

It's an intriguing disc even if you're not shooting for the White House, the State



CD-ROM COLLECTION

BCJ9302 Quick Art Deluxe	\$175.00
BCJ9304 EPS Professional	\$179.00
BCJ9308 Space Time & Art	\$129.00
BCJ9327 Font Fun House	\$39.00
BCJ9324 Ocean in Motion	\$139.00
BCJ9311 MACnificent 7	\$49.00
BCJ9325 Winning Elections	\$89.00
BCJ9310 World Fact Book 1991 + Navigator ..	\$39.00
BCJ9315 Front Page News	\$99.00
BCJ9323 BBS in a Box Vol. VI	\$79.00

Additional titles added continuously.

DATA MODEM, FAX AND ANSWERING MACHINE IN ONE!

The Complete, Compact Communications System THAT USES ONE PHONE LINE.

REVIEWER'S NOTEBOOK: No better value for the savvy businessperson when it comes to communications — one machine that does the work of three! Turn your Mac into a data modem/fax machine/answering machine! Thanks to advanced line-switching techniques, phone calls are handled appropriately whether data, fax or voice, automatically. Send e-mail, receive messages while you're away and more. Prometheus crafts three technologically superior models: The Home Office, The Ultima Home Office and The 24/96 SR Minifax.

The compact Home Office (Tiger price just \$259!) is one of the hottest devices in the industry right now. A speedster at 9600 bps send and receive, with Group III compatibility and a full-featured 2400 bps data modem, it's all you'll ever need...

The Home Office is Hayes compatible and includes MacKnowledge and MaxFax software, and all necessary cables.

The Ultima Home Office delivers all the advantages of Home Office, and gives you the additional power of 14,400 bps data modem afterburners!

Quality crafted and super advanced, Prometheus gives you state-of-the-art performance at an affordable price.

The Home Office Digital Answering Machine. Simply connect your Home Office and you've instantly got a sophisticated voice messaging system. You can easily route incoming messages to any one of 999 mailboxes! Create your own personalized announcements for a specific caller or even custom messages that play on specific dates or times. Password-protect your playbacks, playback from a remote location and minimize toll-fees with Home Office's unique TollSaver feature.

Send And Receive Faxes. Exchange fax

documents with any Group III fax machine in the world. Create a letter on your Mac and zip it out in seconds — Home Office takes care of the details. With Home Office, you can receive faxes from any standalone fax machine or another fax/modem. And when you send or receive a fax, you can continue to work; the faxing takes place in the background, out of your way.

9600 BPS, Error-Free Data Transmission. The Home Office provides incredible throughput (with V.42bis/MNP) for error-free operation and world-class compression. By utilizing V.42bis and MNP technologies together, you can take full advantage of newer, high-speed modems.

The Home Office will automatically negotiate the highest possible setting with the modem you wish to call.

The Prometheus Ultima Home Office. An amazing instrument, packed with advanced technology, able to perform 14,400 bps, full duplex communications. A low-cost answer to the needs of high-speed transfers of large volumes, remote access computing and network bridging. The Ultima is compatible with a wide variety of communications packages and modems.

The 24/96 SR Minifax. It has the ability to exchange fax documents with Group III fax machines worldwide. Create a letter on your Mac and send it directly to another fax machine anywhere in the world. The 2496S/R Minifax will also allow you to receive fax transmissions from a standalone fax machine or even from another fax/modem. Sending or receiving a fax takes place in the background, so you can continue with your work until the transmission is completed.

PROMETHEUS

BCJ2930 Home Office	\$259.95
BCJ2931 Ultima Home Office	\$499.95
BCJ2932 24/96 SR Minifax	\$129.95

All modems come complete with software and cables.



TIGER CD-ROM

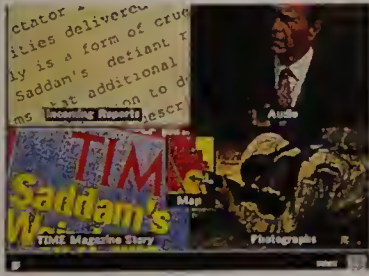


THE \$349 CDR-73

REVIEWER'S NOTEBOOK: If you're ready to get into CD-ROM, Tiger has a spectacular offer on the fastest reader in the business. The NEC CDR-73, with a remarkable 350 millisecond response time — for just \$349!

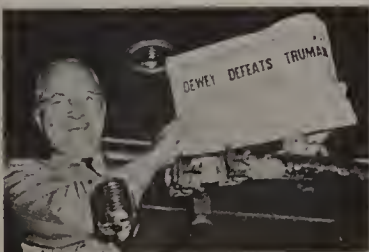
PhotoDisk 1100 Images. PhotoDisk delivers immediate and economical access to over 400 outstanding professional digital photographs. Each one ready to publish with virtually no use restrictions. Every PhotoDisk image is ready to be used instantly in advertising, newsletters, presentations, brochures, and multimedia projects.

Desert Storm: The War in the Persian Gulf. The acclaimed CD that lets you experience Operation Desert Storm in full sight and sound. Chronicling the war and the events that precipitated it, it provides news reports, eyewitness accounts, photos, sound recordings, detailed maps and more.



CIA Fact Book. The CIA has been busy — collecting facts, stats, maps, sound clips and more! They've assembled megabytes of inside information on one CD and made it available to you. A seemingly endless array of information about military issues, gross national product, population, personal income, standard of living, occupations, spending and hundreds more categories. CIA Fact Book contains high-quality maps by Hammond.

The Toolworks Illustrated Encyclopedia. Critically acclaimed and widely used, The Toolworks Illustrated Encyclopedia features the entire text of a 21-volume encyclopedia — stored on a single compact



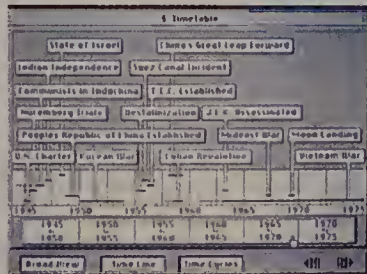
disc! The Toolworks Illustrated Encyclopedia allows searches by title, word, or phrase of the latest information on science, contemporary life, law, sports, and much more. Over 30,000 articles enrich this highly regarded reference.

Software Toolworks World Atlas. This title is an almanac, world factbook and atlas — all in one! It's a remarkable package that contains the most extensive collection



of full-color maps you'll find anywhere. There's also plenty of data about each country and region: rainfall, population, industry, crime and more. You can take a trip around the world in just a few minutes — great for travelers, students, educators and businesspeople! Over 240 fully-detailed, fully printable maps.

U.S. History. U.S. History on CD-ROM provides detailed coverage from a variety of historical perspectives on political, aerospace, geographic, social, military and economic history. In addition, the disc includes 1,000 photographs, maps and tables relating to historical events.



The Time Table of History: Science and Innovation. Or, slip in the Time Table of History: Science and Innovation. More than 6,000 interrelated entries show the chronology of historical, scientific and technological events from the beginning of time to the present. Over 1,000 multimedia graphics and stereo sound.

The Family Doctor. Provides invaluable home medical information in easy to understand language from multiple sources and perspectives. In addition, Dr. Bruckheim, MD, FAAFP (a nationally recognized physician and syndicated columnist) answers over 1500 frequently requested medical questions in an easy-to-use Question and Answer format.



SuperMac Tool Kit. Contains an exciting, interactive video demonstration of one of the hottest developments in the Macintosh market today — QuickTime moviemaking with the VideoSpigot real-time digital-video capture card. Everything you need to run the demo — and experiment with VideoSpigot for yourself — is right on this CD-ROM.

Britannica Family Choice. Includes fifteen software titles for the whole family... Berenstain Bears, History, Geography, Designasaurus, The Body Transplant and many more! Excellent family fare...



Sherlock Holmes. The world's greatest detective, Sherlock Holmes, along with Dr. Watson plunge headlong into their greatest cases. The entire treasury of Sir Arthur Conan Doyle's classic tales on a single CD.

TIGER CD-ROM

NEC CDR-73

CDR 73 CD-ROM Reader \$349.00

COMPLETE INTERFACE KIT

Complete Interface Kit \$ 99.00
Adobe Premiere Sampler 39.95
SpeedyCD 99.95

A \$238.90 VALUE FOR \$99

TIGER REFERENCE KIT

Persona Speakers 80.00
PhotoDisk with 1100 Images CD-ROM 695.00
CIA Fact Book CD-ROM 99.95
Desert Storm CD-ROM 99.95
Toolworks Illustrated Encyclopedia CD-ROM 395.00
World Atlas CD-ROM 79.95
U.S. History CD-ROM 395.00
Timetable: Science & Innovation CD-ROM 99.95
SuperMac Tool Kit CD-ROM 39.00
Britannica Family Choice CD-ROM 604.00
Sherlock Holmes CD-ROM 69.95
Family Doctor CD-ROM 149.95
TOTAL FOR REFERENCE KIT \$2,807.70

TIGER SPECIAL - A \$3,395.60 VALUE FOR \$199.

BCJ8173 CDR-73 CD-ROM Reader
Interface not included \$349.00
BCJ8299 Complete Interface Kit \$99.00
BCJ8296 Tiger Reference Kit \$199.00

**Unity™ 1000**

- ▼ 1000 dpi
- ▼ 8.5" x 11"
- ▼ \$6,995

Unity™ 1200XL

- ▼ 1200 dpi
- ▼ 11" x 17"
- ▼ \$9,995

PLUG & PLAY TYPESETTING

Now Has a Big Brother

Multi-platform connectivity... 1000 dpi... Lots of fonts... Super-fast print speeds... When we introduced our Unity™ 1000, it seemed things couldn't get any better. But now they have.

Introducing the Unity 1200XL. It's got a host of great features like the Unity 1000. Plus, it handles up to 11" x 17" paper for all your oversized jobs! Just plug it in, and you get perfect, 1200 x 1200 TurboRes® output, from just about any computer out there.

Give us a call for sample output from our new Unity 1200XL. You'll see how plain-paper typesetting will save you money.

UNITY 1200XL FEATURES

- 1200 x 1200 TurboRes® output
- Internal hard disk with 135 pre-installed Type 1 typefaces
- High-speed, 33-MHz processor with floating-point unit
- 40K of fast-cache memory
- TurboGray™ halftone enhancement
- LocalTalk®, parallel, serial, and Ethernet® (optional) ports
- HotPorts™ automatic port switching
- SmartSense™ automatic emulation sensing
- Flexible paper handling up to 11" x 17" with up to 3 paper sources (optional)
- Expandable RAM
- Software-upgradable controller

And for the budget-minded...

The LaserMaster 1000/4 Personal Typesetter is the perfect alternative for budget-minded graphic arts professionals who do not need multi-platform capabilities. The low-cost, CPU-based controller of the LaserMaster 1000/4 produces 1000-dpi, camera-ready copy for just \$3,995, PC or Mac version.



1-800-950-6868 • 612-944-9330 • Fax: 612-944-0522

DEPT. 19K

Circle 43 on reader service card

MAC WORLD

THIS MONTH:

Apple's PowerBook 145 • MacProject Pro • Radius VideoVision • Lotus Notes • EDI for the Mac

BY DAN LITTMAN AND TOM MORAN

Lotus Notes for Mac

Lotus is expanding its presence in the Mac market with Lotus Notes, which is best described as a groupware generator.

Lotus Notes users design forms and put them out on the network, where their colleagues access them for such tasks as carrying on a structured discussion, following up on client contacts, or simply distributing finished documents. Notes includes an E-mail system and remote-access capability. It can perform calculations; supports



FRONT END TO AN EXAMPLE OF A MULTIPURPOSE GROUPWARE APPLICATION ASSEMBLED USING LOTUS NOTES.

Object Linking and Embedding (OLE) under Windows (but not publish and subscribe on the Mac); and provides rout-

ing management and security features. A programming interface allows you to tie Notes applications to databases or other third-party software.

The Mac product, which will ship this winter with the 3.0 release of Notes, is a client and requires an OS/2 server. Pricing was not set at press time. Lotus, 617/577-8500.—D.L.



JOHN WILLIAM LUND

THE RASTEROPS/20T MULTISCAN COLOR DISPLAY WORKS WITH MACS, DOS MACHINES, AND SUN WORKSTATIONS.

RasterOps Multifrequency Monitors

RasterOps has introduced two 20-inch multifrequency color monitors that can work with Macs or DOS PCs. The RasterOps/20T MultiScan Color Display uses a Trinitron tube and is compatible with all display adapters from RasterOps and many adapters from other third-party vendors for the Mac, DOS machines, and Sun SPARCstation systems. It supports resolutions ranging from

640 by 480 pixels to 1280 by 1024 pixels and refresh rates ranging from 50Hz to 120Hz, inversely proportional to the selected resolution. The \$3499 monitor is shipping now.

The RasterOps/20 Multi-Scan Color Display contains a Hitachi tube and is compatible with all display adapters from RasterOps and with VGA adapters. Its resolutions range from 640 by 480 pixels to 1024 by 768 pixels, also at refresh rates from 50Hz to 120Hz. The Hitachi-based \$2499 monitor is also available now. RasterOps, 408/562-4200.—T.M.



APPLE'S POWERBOOK 145 OFFERS THE PERFORMANCE OF THE POWERBOOK 170 WITH A LESS-EXPENSIVE DISPLAY.

PowerBook 145 Replaces the 140

For those who want the performance of a PowerBook 170 but aren't willing to carry the hefty price tag, Apple has brought out the PowerBook 145, a *continues*

TREND

The Next Best Thing

NEED TO LOOK SOMEONE in the eye while you discuss a project over the telephone? Take a look at Northern Telecom's new Visit Video.

Visit Video includes a black-and-white video camera and a digitizing board that digitizes your mug at 10 to 15 frames per second and shoots it down a switched 56 or ISDN line to a window on another computer. Visit Video's software offers



TALKING HEADS. VISIT VIDEO ALLOWS PARTICIPANTS TO DRAW ON EACH OTHERS' SCREENS.

file transfer and screen sharing, and has pencils, highlighters, and other tools for collaborating on on-screen documents.

The Visit Video package costs from \$2900 to \$3500 per person and may not be compatible with all digital phone systems. Northern Telecom is also working on a color camera and board. Northern Telecom, 214/684-5930.—D.L.

WORDPERFECT IS A REGISTERED TRADEMARK OF WORDPERFECT CORPORATION WITHIN THE UNITED STATES AND OTHER COUNTRIES. ALL OTHER NAMES AND PRODUCT NAMES ARE TRADEMARKS OR REGISTERED TRADEMARKS OF THEIR RESPECTIVE COMPANIES. WORDPERFECT CORPORATION © 1993

☞ Mac is Mac and Windows is Windows and WordPerfect® plays no favorites. ☞ If Macintosh is your idea of what a computer should be, WordPerfect has a powerful, elegant System 7 word processor that only proves you right. ☞ If Windows is more to your liking, WordPerfect has a best-seller that makes the most of it. ☞ Yet surprisingly, WordPerfect for Mac documents are compatible with WordPerfect for Windows. Which means that an office divided against itself *can* stand, after all.

WordPerfect®

FOR INFORMATION CALL 1-800-526-5178

model that features the 170's oomph combined with the less-expensive backlit supertwist LCD screen used on the PowerBook 140. The PowerBook 145, which replaces the PowerBook 140, gets its muscle from a 25MHz 68030, the same processor used in the 170. The 145's system board is essentially the same as that of the 170. As a result, the 145's performance is about 35 percent higher than that of a PowerBook 140.

The new laptop ships with System 7 already installed and with a minimum of 4MB of RAM, expandable to 8MB. It weighs 6.8 pounds, the same as the 140 and 170. Apple will offer two models: the PowerBook 145 4/40 with a 40MB hard drive, and the PowerBook 145 4/80 with an 80MB hard drive. Apple describes the 4/40 as a "price point machine" at \$2399 list and positions the 4/80 to compete with Compaq's Contura 3/25 (with trackball and Windows added). Both models of the PowerBook 145 were available from Apple dealers at their introduction on August 3.—T.M.

DESKTOP LIBRARIAN

Books on QuarkXPress

This month we peruse three books on QuarkXPress.

- *The Official QuarkXPress 3.0 Handbook*, by Diane Burns and Sharyn Venit (1990, \$24.95). Billed as a complete reference, this book is organized in three parts: using QuarkXPress, advanced techniques, and case studies. The first section starts with an introduction to the Mac and basic QuarkXPress functions, then discusses document creation and printing. The section on advanced techniques covers shortcuts, troubleshooting, and project management. The seven case studies are about publications that converted from traditional methods to QuarkXPress. Bantam Computer Books, 212/492-9666.

- *The QuarkXPress Book*, by David Blatner and Keith Stimely (1991, \$24.95). This volume begins with an overview of the program, then moves through chapters on document construction, putting text and pictures on a page, modifying images, color, and printing. Each chapter contains a multitude of tips. The book also includes appendixes on PostScript and additional resources. Peachpit Press, 415/527-8555.

- *QuarkXPress 3.1 By Example*, by Tim Meehan and Cynthia Williams (1992, \$26.95). Covers the Mac and QuarkXPress basics, then gives examples of how to create your first document, followed by chapters on word processing, typography, working with graphics, and color and trapping. The book ends with examples for page layout, case studies, and a chapter on printing. Includes a section in color and a glossary. M&T Books, 800/533-4372, or 800/356-2002 in California.—T.M.



THE OFFICIAL QUARKXPRESS 3.0 HANDBOOK, THE QUARKXPRESS BOOK, AND QUARKXPRESS 3.1 BY EXAMPLE.

BERNARD MARQUE

TREND

EDI for the Mac

MANY LARGE COMPANIES and government agencies require contractors and suppliers to use Electronic Data Interchange (EDI), a paperless system of exchanging purchase orders, invoices, shipping notices, and other standard business information. Digit Software's MacEDI provides EDI support for the Macintosh.

MacEDI translates EDI-format data from other computers into a format that Macs can read, and translates Macintosh data into EDI format for other computers. It also supports direct communication with other computers and many third-party EDI exchange systems.

MacEDI 2.1 is \$1950 and supports a new standard for exchanging engineering and technical information, called the X12 841 transaction. MacEDI Mapper, a companion product for relating fields in a database to EDI entities, is \$1500. Digit Software, 301/593-8952.—D.L.



TIM ABBOTT OF ABBOTT TRANSPORTATION IN SPARKS, NEVADA, IS AN EARLY ADOPTER OF EDI ON THE MAC.

DAN MILLS

GCC's Fast Optical Drive

The UltraDrive 120MO from GCC is a 3½-inch magneto-optical drive that has a 35ms average access time, which brings it into the speed domain

of hard drives. The drive's cartridges hold 120MB of data, and are compatible with the ISO standard incorporated in other vendors' 3½-inch erasable optical drives with about the same capacity.

The UltraDrive 120MO has a retail price of \$1899, including one cartridge, cables, GCC's DriveManager hard drive-management software, and Central Point Software's MacTools Deluxe utilities package. Additional cartridges retail for \$69, and GCC will include a second free cartridge with drives that are sold through September 15. The UltraDrive 120MO was slated to ship in August. GCC, 617/890-0880.—T.M.

Dataproducts' 600-dpi Printer

DATAPRODUCTS Corporation has announced the LZR 965, a PostScript Level 2 laser printer that produces 9 pages per minute at 600-by-600-dpi resolution. Based on a Sharp print engine, the device also includes a Weitek 8200 RISC chip for faster processing of complex images.

The printer comes with 8MB of RAM expandable to 16MB, and it has connectors for SCSI, LocalTalk, Centronics parallel,

News

Radius Ships VideoVision

Radius has officially introduced VideoVision, a digital video product based on technology purchased from Apple and previously announced under the code name Touchstone. Intended for low-cost desktop video publishing, VideoVision transfers integrated graphics, sound, and video back and forth between a NuBus Macintosh and television devices; eliminates flickering; and transfers digital output to standard VHS tapes. The output transferred to videotape can include digital graphics, sound files, and the like.

VideoVision is a 24-bit NuBus board intended to be used with video-editing applications such as Adobe Premiere and DiVA VideoShop. Radius began shipping VideoVision at the end of July. The product's list price will be \$1999, and for a limited time, that will include DiVA VideoShop and Macromedia's Action presentation software. Radius, 408/434-1010.—T.M.



THE LZR 965 IS A POSTSCRIPT LEVEL 2 PRINTER THAT PRODUCES 9 PAGES PER MINUTE WITH HIGH RESOLUTION.

and RS-232C serial ports. The LZR 965 can sense which ports are receiving files.

Dataproducts expected to begin shipping the LZR 965 in mid-September at a list price of \$2995, including drivers for Windows and Macs. Dataproducts, 818/887-8000.—T.M.

Unlimited storage. Unbelievable price.

Introducing the Bernoulli® MacTransportable 90 PRO.



System 7. Quick-Time. Graphics. They eat storage.

And nothing handles storage like the Bernoulli MacTransportable 90 PRO from Iomega®.

The best removable storage system you can buy.

Bernoulli is better than a hard disk because it won't fill up. You simply insert another affordable 90MB disk.

It's better than conventional removable storage systems, too, because it was built from the ground up to be removable. No other removable drive has Bernoulli's 75,000-hour Mean Time Between Failure

rate, Bernoulli's proven head-crash resistance, and the industry's most rugged disks—able to withstand an eight-foot drop.

And it's better than magneto-optical because you get twice the performance for half the price.

The lowest-priced Bernoulli for the Mac.

The latest entry in our complete line of products for the Mac, the new MacTransportable costs 40 percent less than previous models. Plus, it comes complete with an interface kit and 90MB disk. Advanced



Transportable, dual drive, and Quadra Insider versions are also available.

Hard-disk performance.

Enhanced 90 PRO drives have a fast 18-msec effective access time. That's as fast as a hard disk.

The most recommended drive.

Bernoulli is the only removable drive to receive the Macworld World Class Award the last two years. And it has also won the Publish Reader's Choice award, making it the new choice in desktop publishing. We have a 99% customer satisfaction rate. And we're the only computer company to win the Shingo Prize for excellence in American manufacturing.

Call 1-800-374-8506.†

Unfortunately, this ad isn't a Bernoulli. We're out of space. So call for a brochure. Because now unlimited storage is at an unbelievable price.

IOMEGA®
Makers of Bernoulli



VIRUS WATCH

CURRENT VIRUSES, TROJAN HORSES, AND WORMS

T4-A, T4-B

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 10/92
INFO: Initially discovered in a game called GoMoku
IMPACT: Both versions of T4 damage system files and applications

ChinaTalk

TYPE: Trojan Horse
FIRST LISTED IN VIRUS WATCH: 10/92
INFO: ChinaTalk is an INIT that comes with a read-me file that claims it provides a female voice for MacinTalk
IMPACT: Deletes the contents of disk drive on restart

INIT 1984

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 8/92
INFO: Infects INITs; becomes active only on Friday the 13ths
IMPACT: Destroys files and changes file and folder names and attributes to random garbage

Code 252

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 8/92
INFO: Displays a message telling user it is destroying contents of hard drive
IMPACT: After displaying message, it deletes itself without causing damage. Infected Macs may behave erratically

MBDF

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 6/92
INFO: Initially distributed via Trojan horse program called Tetricycle, but can spread like other viruses
IMPACT: Does not destroy data; may disable applications

Drafting a Ballet

The San Francisco Ballet's upcoming season includes 18 ballets, from *Swan Lake* to *Rodeo*. That means a lot of scenery sliding in and out on the 68-foot-long battens that travel the width of the stage. It also means hundreds of changes in lights, backdrops, stage masking, and flying scenery. Production manager Michael Kane and stage manager Peter Butt begin each of these complex architectural productions by sketching out stage plans from all perspectives in Innovative Data Design's MacDraft, experimenting until they're sure the audience won't see lighting instruments, scenery won't take up too much dancing space, and flying scenery won't collide. Final plans go into an Excel spreadsheet for the carpenters, electricians, and flymen (who control flying scenery) to plan their tasks.—ANN GARRISON

Electronic Chamber Orchestra

COMPOSER GUY GARNETT is planning to conduct an unusual chamber orchestra: human flutist Priscilla Call and a Yamaha TG77 synthesizer, which will play piano and harplike parts. In one hand, Garnett will wield a conducting baton that sends an infrared signal to control the synthesizer's tempo and phrasing. From Garnett's other hand, an electronic glove will send signals to a Mac running Op-



GUY GARNETT CONDUCTING FLUTIST PRISCILLA CALL WITH HIS RIGHT HAND AND A MAC WITH HIS LEFT HAND.

Code Systems' Maxnet software to control timbre, spatialization, and reverberation of both the flute and the synthesizer's sound. The orchestra will perform at the 18th Annual International Computer Music Conference, which runs October 14 to 18 at San Jose State University in San Jose, California. For more information call 408/924-4675.—ANN GARRISON

Games Computers Play

How well can CB Sim, an artificially intelligent "agent," play the role of urban planner? During the next two years, University of Chicago computer scientists Kristian Hammond and Charles Martin will observe as CB Sim plays SimCity, the urban-planning-simulation game from Maxis. Hammond and Martin's AI software has two components: CB, an agent capable of "case-based reasoning," or reasoning from experience, and a database of cases. Thus, if asked to reduce crime in an industrial urban area, CB would consider past solutions to similar problems and might conclude that more housing would increase population, raise the tax base, and make more police affordable.—ANN GARRISON



DOROTHY CARICO SMITH

News

For Network Managers

TechWorks is expanding its position in the Mac networking market with TechWorks Net Utilities, a collection of management utilities that comes with real-time conferencing software. NodeWatch is a background spy that informs network managers when devices appear or disappear from the network; it can watch across multiple zones and routers. For debugging flaky nets or testing the impact of newly installed software, NetTimer can send echo packets and record response times. Other utilities provide information about laser printers and other devices on the network. MultiChat allows users on a network to exchange text, sounds, Clipboard contents, and files. Discussions are presented in chronological order and can be encrypted, but MultiChat provides no store-and-forward capability. TechWorks Net Utilities lists for \$129. TechWorks, 512/794-8533.—D.L.

TREND

Portable Floptical Drive

Mass Microsystems has joined the parade of peripherals vendors offering hybrid floppy-optical Floptical drives but with a small difference: the FloptiPak 21 weighs under 2 pounds and measures only 1 inch by 9 inches by 5 inches. The 21MB FloptiPak 21 achieves its small size in part because it gets its power from the Macintosh's floppy disk port and therefore does not need its own power supply.

Like other Floptical drives, the FloptiPak 21 is based on a mechanism made by Insite Peripherals that combines magnetic and optical recording on a disk the same size and shape as a 3.5-inch floppy disk. The drive can also read and write to 1.44MB Mac floppy disks. The FloptiPak 21 has a suggested retail price of \$699, and the disks retail for \$49. It began shipping in June. Mass Microsystems, 408/522-1200.—T.M.



ROBERT PERRY

MASS MICROSYSTEMS' FLOPTIPAK 21 IS A PORTABLE FLOPPY-OPTICAL DRIVE THAT CAN STORE UP TO 21MB OF DATA.

The Preferred Choice...

Featuring Sony Optical Technology



MicroNet's Rewritable Optical Systems Offer More Speed, Size, and Performance Options For Removable Data Storage.

Today's complex projects require forward-thinking storage solutions. That's why MicroNet has added a new 3.5" rewritable optical system to our Macintosh, PC, and workstation product lines. It's fast, reliable, and cost-effective. Store 128 MB on a shirt-pocket-size disk at a lower media cost than any other system. Access data in just 38 ms. And secure valuable files now, and far into the future with optical cartridges impervious to contamination and head crashes.

MicroNet also offers 5.25" optical storage options. Our 586 MB system is perfect for transporting or archiving large CAD, pre-press, or graphic files from work site to work site. And like our 3.5" system, it's ISO compatible, so media can be recognized in any ISO standard drive.

MicroNet's rewritable optical systems for the PC operating under NetWare, ship with our specialized driver for optimum performance. And systems on a PC network, when combined with Cheyenne's ARCserve or ARCserve/Solo, make archiving and retrieving Macintosh, OS/2, and DOS files fast and easy.

MicroNet's 3.5" and 5.25" drives are available in internal and external configurations for most computer systems. They ship ready to install with software, connectors, cables, and brackets as needed.

Find out why MicroNet's systems are the preferred choice in rewritable optical storage. Call the MicroNet Sales Department today for the name of a Reseller near you. 1-714-837-6033.



Quality You Can Count On.



MicroNet Technology, Inc.

20 MASON • IRVINE, CA 92718 • TEL: (714) 837-6033 • FAX: (714) 837-1164
AppleLink: MICRONET.SLS • Compuserve: 76004,1611

All trademarks are the property of their respective owners.

Circle 113 on reader service card

FREE Software!



**YOURS
FREE!**

Simply mail this card today to MACWORLD and we'll send you—*absolutely FREE*—the new “Best of Educorp” software disk, which includes *Money Matters* for maximizing your personal finances...*Project Leader* for organizing your time, fun games like *Spacestation Pheta*, *Glider*, the popular *Klondike*, and lots more!

YES! Please send my FREE Educorp Software and enter a one-year (12 issues) subscription to MACWORLD in my name for only \$19.95. That's almost 60% off the annual cover price of \$47.40.

Name _____

Company _____

Address _____

City/State/Zip _____

☐ **Please bill me.** ☐ **Payment enclosed.** State and county sales tax will be added where applicable

Allow 4 to 6 weeks for delivery. Basic subscription price is \$30 for 12 issues. The annual cover price is \$3.95 per issue, \$47.40 annually. For Mexican subscriptions, please add \$18 per year for shipping. For Canadian subscriptions, add \$18 plus \$1.40 (7% GST). Add \$70 annually for all other foreign countries.

**FREE Software
Subscribe today!**



NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1167 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

**Macworld
Subscription Department
P.O. Box 51666
Boulder, Colorado 80321-1666**





CAMILLE GERACE

TIM REY (LEFT) AND CHEMIST JOSEPH RIBINSKY OF ESSEX SPECIALTY PRODUCTS WITH THE RESULTS OF AN EXPERIMENT.

Getting the Jump on Experiments

TIM REY IS A statistician at Dow Chemical Company's Central Research and Development facility in Midland, Michigan, where 600 chemists and chemical engineers design new plastics, ceramics, and other chemicals and chemical processes. To save money and time, Rey's group helps the chemists weed out unnecessary experiments using a statistical process called Design of Experiments.

Rey is beta-testing SAS Institute's JMP Design, which he describes as "very deep in terms of rigor, but quick to get the design [you need]." JMP Design is a stand-alone tool; results can be moved into JMP itself for further analysis.

JMP 2.0 lists for \$695; JMP Design (including D-Optim, a special JMP add-on) lists for \$295. SAS, 919/677-8000.—D.L.

Virtual Dance World

An artist, an architect, and a dancer are combining virtual reality tools with dance in Dancing with the Virtual Derivish. This fall Diane Gromala, Marcos Novak, and Yakov Sharir will transmit live video of their dance over telephone lines from the Banff Centre for the Arts to sites in Banff, Alberta, Canada; Austin, Texas; and Santa Monica, California. Video monitors at each site will show a dancer in goggles and gloves side by side with the virtual world that the dancer sees in the goggles. Audiences will manipulate the objects in that

ANALYSIS

Mac-Using Travel Agents

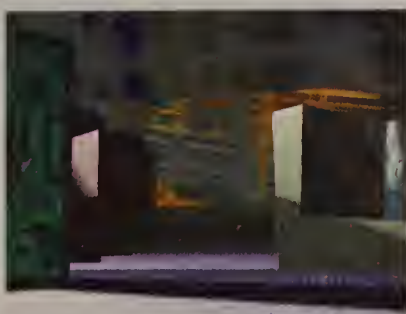
Macintoshes are just beginning to appear on the desks of travel agents, reflecting a sea change in the travel industry.

New Department of Transportation regulations will require computer reservation systems (CRSs) like American Airlines-owned Sabre to let travel agencies use third-party hardware and software, and agencies will be able to store clients' information on their own computers, instead of on the CRS mainframe, to use for business and marketing purposes.

Third-party suppliers are popping up. MicroAge, a big integrated-systems vendor, is selling Mac-to-Sabre systems that use hardware and software from Innosys. TraveLogix is developing agency-management software that will provide everything from a CRS interface to an accounting system. MicroAge, 405/272-9655; Innosys, 510/769-7717; TraveLogix, 512/794-5990.—D.L.



DOROTHY CARICO SMITH



A VIRTUAL STAGE WHERE DANCERS PERFORM TO AN AUDIENCE THAT REARRANGES THE PROPS DURING THE PERFORMANCE.

world and then see not only the dancer's reaction, but also changes in the dancer's virtual world. For more information, call Banff Centre's Art and Virtual Environments Project at 403/762-6651.—ANN GARRISON

Connecting Macs to Color Copiers

HA TELECOM Corporation has created Color Connect and Color Connect Scan, software products that let a Macintosh II-series system use a Canon Color Laser Copier as a printer or a scanner, respectively. The Color Connect setup supports most applications for 32-bit QuickDraw version 1.2, and it can print in either Japanese or English. It has an added antialiasing feature, supports ATM outline fonts and TrueType fonts, and prints on a wide variety of paper sizes at resolutions ranging from 72 dpi to 400 dpi.

Color Connect Scan can also accept still video, NTSC or S-Video, RGB video, or film scanner input. Color Connect Scan permits scanning in color, gray scale, and black and white, at the same range of resolutions as with Color Connect, and with a film scanner at higher resolutions, from 600 to 3353 dpi. Both software products work with TIFF and PICT files.

The Macintosh II connects to the Color Laser Copier via the SCSI port. The products require at least 8MB of RAM, and a 24-bit display system is recommended. The products are available now, bundled together at a list price of \$3500. In the U.S., contact HATNET, 408/725-2800.—T.M.

News

Flying Logos

Pixar is developing Typestry, a utility for creating 3-D text, adding all kinds of special effects, and animating it.

In Typestry you can enter text using TrueType or Type 1 fonts, or import text created or modified with such tools as Ares Software's FontMonger, Altsys's Fontographer, or Letraset's FontStudio. Once in Typestry, you can extrude text into three dimensions, bevel the edges, rotate it, place a backdrop behind the image, and set up a key-frame animation. Typestry provides RenderMan shaders for creating special effects such as making the text look like metal or stone. Typestry will list for \$299. Pixar, 510/215-3469.—D.L.



SETTING UP LIGHTING AND ASSIGNING SPECIAL EFFECTS (WHICH PIXAR CALLS LOOKS) IN TYPESTRY.



TURKEY SHOOT

DESIGN FLAWS NOTED

Sensible Grammar and Grammatik Mac If you run a French- or Spanish-language document through either of these grammar checkers, they'll zip right through without realizing they're not looking at English. They find no mistakes and generate readability scores, and Sensible Grammar even scores the documents for how interesting they are.

AppleLink and Internet Hey, privacy fans, here's a good one. Question: When are blind carbon copies of your E-mail delivered not-blind? Answer: When you send them from AppleLink to the Internet or from the Internet to AppleLink.

Macworld will send you a Turkey Shoot T-shirt if we shoot your turkey in this column. See *How to Contact Macworld*.



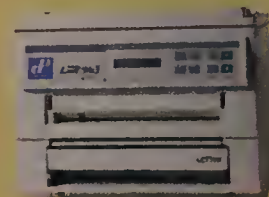
The new LZR 965 from Dataproducts gives you everything you want from a laser printer at a price that may startle you. This true 600 x 600 dpi, Adobe® PostScript® Level 2 laser printer gives you greatly enhanced gray scale capabilities for optimum detail in graphics and photographic images. Even 4-point type is made clean and easy to read. And since the RISC-based processor can provide fast, flawless delivery of higher resolution images your output can look like a masterpiece every time. In no time.

	List Price	PPM	RISC Processor	Postscript Level 2	Resolution 600x600	Warranty
LZR 965	\$2,995	9	Yes	Yes	Yes	2 years
IBM 4029-10A	\$3,995	10	No	No	Yes	1 year
Apple LaserWriter IIg	\$4,999	8	No	Yes	No	1 year
QMS PS815MR	\$5,495	8	No	No	Yes	1 year

Combine Mac and PC system compatibility and superior paper handling with a very small footprint and you'll begin to experience the whole picture.

You don't need a trained eye to see that the extraordinary image quality and technologically advanced features will make this printer a classic for years to come. Add the fact that it's easy to use and inexpensive to own and you'll know why the LZR 965 has everybody talking. For finer details, contact the Dataproducts dealer nearest you or call 800-334-3174.

 **Dataproducts.**
The high performance printer people.™



Copyright 1992 Dataproducts Corporation. Dataproducts and its associated logomark are registered trademarks, and its tagline and LZR Series are trademarks, of Dataproducts Corporation. All rights reserved. Adobe and PostScript are registered trademarks of Adobe Systems, Inc. Grant Wood, American Gothic, 1930, oil on beaverwood, 74.3 x 62.4 cm., Friends of American Art Collection, Copyright 1992 The Art Institute of Chicago. All rights reserved. All product names are trademarks or registered trademarks of their respective companies.

Circle 13 on reader service card



BUG REPORT

Outbound Notebook Computers If you put an Outbound to sleep with a floppy disk in the drive, it will corrupt the disk. Outbound says version 1.3 of the Outbound software will fix this bug and will be sent free to all Outbound owners.

QuicKeys 2.12 May corrupt the universal key set. CE Software says it has sent bug fix 2.12a to all registered users. Version 2.12 reportedly sometimes loses the connection between keys in sequences; version 2.12a does not solve this problem.

WordScan Plus WordScan makes all three passes with some Microtek color scanners, even though it needs only a black-and-white image to recognize the text (this problem may also occur with other color scanners). Calera says it is working on a bug fix.

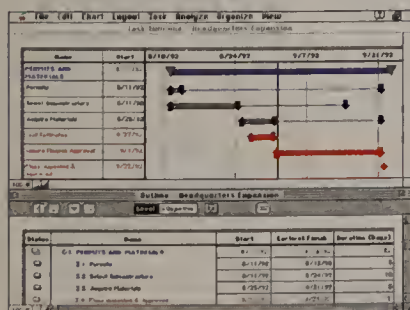
MACWORLD WILL SEND YOU A BUG REPORT T-SHIRT IF YOU ARE THE FIRST PERSON TO INFORM US OF A SERIOUS, REPRODUCIBLE BUG THAT WE REPORT IN THIS COLUMN. SEE HOW TO CONTACT MACWORLD.

MacProject Revised

FOLLOWING Microsoft's big upgrade to Project (see *News, Macworld*, September 1992), Claris is revising MacProject to Pro status.

MacProject Pro fills some big gaps in the earlier version and adds new features. In the gaps-plugged department are a full suite of dependency constraints for task starts and finishes; an outliner (that doubles as a table) for entering tasks; automatic generation of breakdown-structure codes—hierarchical numbering of tasks and subtasks—for tasks (though not resources); a customizable Gantt-chart view; and much improved resource leveling.

In the new features category are support for publish and subscribe as well as Apple events; user-designed multiwindow reports that work as templates with other projects; unlimited



A GANTT CHART WINDOW STACKED ABOVE A TABLE VIEW THAT DOUBLES AS AN OUTLINE IN MACPROJECT PRO.

tasks and resources (each can have its own calendar); and notes attached to charts or tasks. MacProject Pro lists for \$599. Claris, 408/727-8227.—D.L.



WORLD BANK PROJECT IN ANGOLA USES MAP II TO MAP UNPLANNED SETTLEMENTS LIKE THIS ONE NEAR LOBITO.

MAP II: New Dots

In Angola, as in many countries ravaged by war, large migrations, or rapid population growth, there are few accurate maps. When the World Bank began helping the Angolan government to plan taxation, water and sewage services, and so on, urban planners used MAP II to convert Spot satellite images into maps showing structures, population density, and other factors. MAP II, from ThinkSpace, is a raster-based geographic information system—raster systems are more appropriate for land-use analysis, hydrography, and environmental issues than are point-, line-, and polygon-based systems (see "MapInfo's New World," *News, Macworld*, Sep-

Automatic Haystack

TMS'S INNERVIEW is a tool for putting large amounts of information, such as technical documentation and legal reference material, into a form that is easily distributed on a CD ROM. With TMS's ViewDirector, InnerView applications can also include illustrations.

An application can have a table of contents and hypertext links; users can add notes and leave bookmarks; and the database can be expanded with new information stored on a hard drive. InnerView supports Boolean operators and proximity and complex searches.

Preparing data for a TMS system requires a DOS machine and involves developing special filters to structure the raw information (TMS provides consulting services to help first-timers). Pricing depends on application. TMS, 405/377-0880.—D.L.

tember 1992). MAP II can perform such analyses and transformations as averaging values of several map layers (say, crop production over five years) and computing drainage based on terrain and precipitation.

MAP II 1.5 lists for \$345. In the works: MapFactory, which will include a scripting language, closer links to non-spatial databases, and annotation and layout features. ThinkSpace, 519/661-4006.—D.L.

News



IN EXPLORE MISSOURI STREAMS, YOU GET A LOOK AT THE MISSOURI RIVER SYSTEM FROM A FISH'S-EYE VIEW.

Missouri White Water

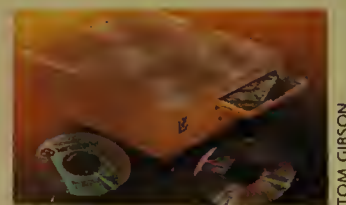
Have you ever wanted to be a smallmouth bass swimming up a stream in the Ozarks? No? How about a naturalist exploring the bass's habits and habitats? At the Saint Louis Zoo in Missouri, you can experience life as the bass *and* the naturalist, and hear from a biologist and other experts, in the interactive Mac-based exhibit Explore Missouri Streams. The exhibit includes 60 minutes of video and a graphic, online atlas of 74 streams. It was produced by Monterey, California-based Sea Studios and programmed by Jeff Reynolds. Saint Louis Zoo, 314/781-0900, ext. 316.—ANN GARRISON

TREND

Photo CD Drive

The Micro/CD-ROM series of CD ROM drives from MicroNet Technology can read several formats, including Kodak's Photo CD photographic-image discs. The drives also support the ISO 9660 and High Sierra formats. The Micro/CD-ROM is an external device, and the company is also offering the Q9i-CD, an internal version for the Quadra 900 and 950. The drives transfer data at a sustained rate of 150K per second and have an average access time of 350ms, according to MicroNet.

Both drives come with a utility that mounts all data and photographic CDs and with a control panel for playing audio CDs. The Micro/CD-ROM lists for \$995, while the Q9i-CD lists for \$895. Both are available now. MicroNet, 714/837-6033.—T.M.



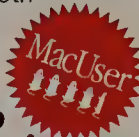
MICRONET'S MICRO/CD-ROM DRIVE CAN READ KODAK'S PHOTO CD FORMAT FOR STORING PHOTOGRAPHS ON COMPACT DISCS.

Now there's a Doubler for every single Mac.

Data compression is an essential tool for Macintosh®. But different users need different functions. That's why Salient offers a choice.

Whether you want hard disk compression that's completely automatic, or a hands-on utility with a variety of functions—or both—Salient has the "Doubler" for you.

AutoDoubler™, the fast, automatic, hard disk maximizer.



AutoDoubler is the effortless way to save hard disk space. You just double click to install and AutoDoubler does the rest. It compresses everything you want compressed, increasing disk space up to 100% or more.

AutoDoubler won't interrupt your work. It compresses only when your system is idle. It's compatible with other utilities. And it's so fast, you'll hardly notice it's there — just click on a file and it opens, pronto.

AutoDoubler, the solution to your hard disk space problems, is now available in a 10-pack.

"The true beauty of AutoDoubler is its complete invisibility."
— Publish magazine, 2/92



DiskDoubler™, the hands-on compression tool.

DiskDoubler makes it easy to copy large files to diskette, speed modem transmission, archive data, or simply free disk space.

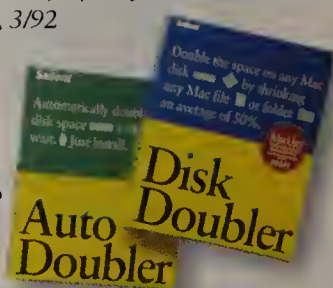
DiskDoubler shrinks files an average of 50%, so it saves you time and money when sending via modem. It also creates self-expanding archives, so files can be opened without DiskDoubler. "Split" and "combine" functions give you extra flexibility in archiving and copying.

DiskDoubler is fast and easy — use it for all your hands-on compression needs.

"Not only is it [DiskDoubler] among the top speed and efficiency performers, but it's utterly safe for your data."
— David Pogue, MacWorld, 3/92

Two Doublers are better than one.

For complete flexibility, use AutoDoubler and DiskDoubler together. They're 100% compatible, 100% safe.



The compression company has expanded!

Salient is now a part of Fifth Generation Systems. That means our customers will enjoy the backing of a world leader, including a one year money back guarantee and 24-hour, 7-days-a-week, toll-free telephone support.

Salient®

A FIFTH GENERATION SYSTEMS COMPANY • 415 / 321 - 5375

Fifth Generation Systems, Inc., 10049 N. Reiger Road, Baton Rouge, LA 70809. Sales Number: (800) 873-4384; Technical Support: (800) 766-7283. AutoDoubler, DiskDoubler, and Salient are trademarks of Salient Software, Inc. Macintosh is a registered trademark of Apple Computer, Inc. © 1992

Circle 39 on reader service card

Low-Power Macs

Apple and a number of other personal computer makers have agreed to redesign their desktop systems and peripherals to use less power, causing less damage to the environment. Under the terms of an Environmental Protection Agency-sponsored program called Energy Star Computers, Apple and the other hardware vendors will add features such as automatic shut-down when not in use, and low-power mode when idle. The energy savings may be 60 percent or more, according to EPA studies.

Products that meet the new EPA guidelines will be permitted to display an Energy Star logo that will be released to the vendors in about a year. IBM, Hewlett-Packard, DEC, Compaq Computer Corporation, and NCR Corporation have also signed up for the Energy Star program.—T.M.

Voice-Recognition Software

ARTICULATE SYSTEMS, a pioneer in Mac voice-recognition systems, has introduced a software-only version of its Voice Navigator voice-driven interface. The software, called Voice Navigator SW, works in Macs with a built-in microphone: the Classic II, LC and LC II, IIsi, Quadras, and PowerBook 140 and 170. Owners of other Mac systems can still purchase the Voice Navigator II hardware for \$699; Voice Navigator SW (the software-only ver-

How to Make a Virtual Object

RARE ART AND ARTIFACTS are usually kept under glass and handled only by curators and preservation experts. Now Apple's Human Interface Group has prototyped a tool to make unique objects more accessible. The system has metal scaffolding with arms that hold a video camera, and a Mac cabled to both the camera and the camera arms. HyperCard scripts direct the camera to circle the object, shooting it from many angles. The still-video frames are then digitized into QuickTime format for random access. Dan O'Sullivan and Mike Mills designed the system, and Ian Small and Michael Chen wrote the software. The group may market the software as a tool kit, but has no plans for the hardware component.—ANN GARRISON



KODAK'S RFS 2035 FILM SCANNER CAN SCAN A SLIDE AT 24 BITS AND 2000 DPI IN LESS THAN 2 MINUTES.

Fast Kodak Film Scanner

Kodak has brought out the RFS 2035 professional film scanner, which can complete 24-bit color scans of 35mm negatives or slides at 2000 dpi in less than 2 minutes. The scanner also has several lower-resolution modes, including a black-and-white preview mode for selecting the area of the negative or slide to be scanned in color. The device

sion) lists for \$399.

The Voice Navigator technology enables users to control the Mac and its applications by speaking, after training the system to recognize the user's voice and entering digitized versions of the most common commands. Articulate Systems, 617/935-5656.—T.M.

is compatible with Macs and with DOS machines that have SCSI adapters installed.

Other features include automatic exposure-setting, focusing, and color-balancing, and fixed and adjustable film channels. The scanner can accept four slides or six negatives inserted in a horizontal strip fed through the fixed film gate. Plug-in image-acquisition modules for Photoshop and PhotoStyler come with the scanner, which lists for \$7995 and began shipping in July. Kodak, 800/465-6325.—T.M.



ALDUS'S FETCH AND PHOTODISC'S LIGHTBOX CAN ARCHIVE ENORMOUS AMOUNTS OF DIGITAL ART.

Artist's Attic

SOFTWARE TOOLS for dealing with enormous amounts of digital art are evolving.

Aldus recently took over publishing the art-archiving program Search from Multi-Ad Services and changed the program's name to Fetch, adding support for many new formats including QuickTime, Kodak's PhotoCD, JPEG, and the AIFF and SoundEdit sound formats. Windows can be resized, keywords can be batch-entered, and catalogs can be password-protected.

PhotoDisc, a company that publishes stock photography on CDs, is now marketing its

Mac Walks in Space?

At NASA's Johnson Space Center, a simple robot delivers mail to engineering offices by following a predesignated route, signaling at each door where it makes a drop-off. Meanwhile, NASA robotics engineers are using Mac Quadras to design circuit boards for future robots, whose advanced features may include vision systems and proximity sensors. Since the prototype robots use controller boards based on the Motorola 68000 chip that also drives the Mac, Macintosh compilers can be used to develop and debug robotics programs. The prototype robots can be controlled by Macs via wireless modems. The robots are primarily research projects for evaluating future requirements and designs and are not likely to be employed building the space station.—PHILIP CHIEN



LOUIS MCFADIN POSES WITH A ROBOT AT THE JOHNSON SPACE CENTER'S AUTOMATION AND ROBOTICS DIVISION.

archiving software as LightBox. LightBox supports Boolean searching on index terms and can save search criteria for reuse. It has a proprietary thumbnail format for resizable thumbnails, and a built-in slide show feature.

Pricing for both products was not set at press time. Aldus, 206/622-5500; PhotoDisc, 206/441-9355.—D.L.

J U S T F O R F U N

Total Baseball

Have a friend who spouts baseball statistics at the mere mention of summer? I do, and I shudder to think of what will happen if he sees Creative Multimedia Corporation's Total Baseball, a CD ROM of baseball history that includes 2600 pages of statistics going back to 1871. Billed as the most comprehensive of baseball encyclopedias, Total Baseball contains stats on pitching, hitting, and fielding for major leaguers, as well as team standings and info on batting champions and other titans of the game. Covering more than 13,000 players up through the 1991 World Series, the CD ROM also offers images of historic ballparks, articles on baseball scandals and oddities, and sound clips from famous personalities. Total Baseball lists for \$69.95 and works with Macs and DOS machines. It is now shipping. Creative Multimedia, 503/241-4351.—T.M.

THE ONLY 8MM TAPE DRIVE THAT CAN MAKE CHANGE.



IT MAKES CENTS. Take the magazine you're reading. To fill a single 8mm tape, you could backup every issue of MACWORLD for the next two years. A single issue costs just about 33 cents to store. Consider that you're spending less time backing up more data, and you're no longer dealing with small change.

Using our high speed, high capacity 8mm tape drives will save you time and money in manhours, media, storage, and shipping costs. In fact, our drives give you the lowest cost per megabyte on the market. On lightweight, reliable media. That is fast becoming an industry standard.



AND IT MAKES SENSE. The menu driven software features a calendar for automatic operation. Schedule a backup to run at any time, day or night. Choose an incremental or complete backup. The software's directory will keep track of every file that you've saved. To restore a file, simply pull up the directory and click on the file you want; if you want to create space on the hard drive, just copy selected files into the archive.

Compatible with all Macintosh models including systems running A/UX, our drives give you between 2.5GB and 25GB of storage per tape. Features like a liquid crystal display, data compression, data encryption, and high speed search capability give our drives the flexibility to adapt to your changing needs. We can meet any site requirements with rack mounting options, hard disk configurations, and a variety of cable lengths. And we back every product in our line with a 12-month warranty and technical support.

It doesn't make cents to wait. Call today for more information at 804/873-9000.

CONTEMPORARY
CYBERNETICS
Group

TRUE "PLUG-AND-PLAY" COMPATIBILITY WITH:

Alliant	DataGeneral	IBM	NCR	Pyramid
Alpha Micro	DEC 3100	Mainframe	Novell	Sequent
Altos	DEC BI-Bus	IBM	OS/2	Silicon
Apollo	DEC HSC	RISC/6000	PS/2	Graphics
Arix	DEC Q-Bus	IBM RT	PC 386/ix	Sun
AT&T	DEC TU/TA81	IBM S/38	PC MS-DOS	Unisys
Basic-4	DEC Unibus	Macintosh	PC Xenix/Unix	Wang
Concurrent	Gould/Encore	McDonnell	Pertec	and more
Convergent	HP	Douglas	Plexus	
	IBM AS/400		Prime	

Basic Black

Fractal Design is working on Sketcher, a new gray-scale package that replaces ImageStudio and simulates artist's materials like Fractal Design's color paint package, Painter.

Sketcher's interface is similar to Painter's, and the same texture files work in either program. Individual tools can be pulled off the palette and arranged around the working surface (Sketcher's tools lack most of Painter's high-end controls). Sketcher can take advantage of pressure-sensitive tablets—for example, drawing a wider line when pressure on the stylus is increased—and provides ways for mouse users to get similar effects. Type can be converted to friskets, Fractal Design's term for masks. Sketcher can also record a series of strokes or other actions and play them back, for example, to apply the same changes to several images.

Sketcher will list for \$149. Fractal Design, 408/688-5300.—D.L.



IS IT SKETCHED—OR IS IT SKETCHER? FRACTAL DESIGN'S NEW PROGRAM SIMULATES BLACK-AND-WHITE DRAWING TOOLS.

Xerox's Paperless Documents

A XEROX-FUNDED START-UP called Documentum is developing a system of the same name for managing documents in almost any kind of computing environment.

Documentum doesn't incorporate the contents of documents in its own database, instead it maintains documents in their native format—for example, Word, FrameMaker, or Lotus 1-2-3. It manages document distribution, tracks revisions, and searches documents by attributes (such as who created a document or when) and by content. Documents can be linked hierarchically in complex groups—for example, from pages to chapters to volumes.

Documentum is client-server based and supports Macs as well as Unix and Windows machines. Documentum will develop versions that work with all major database systems and networks, and also plans to produce an end-user, shrink-wrap version. Price depends on configuration. Documentum, 510/460-4120.—D.L.

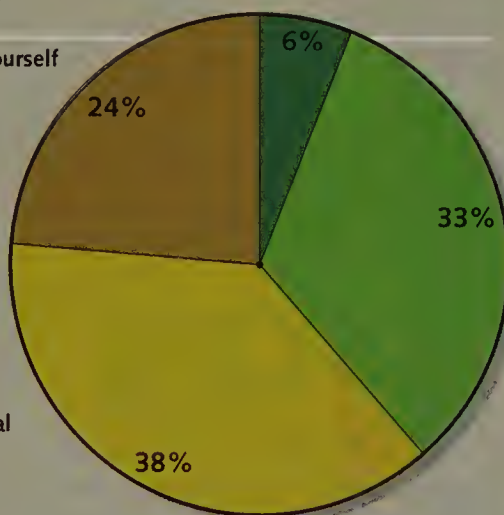
Survey: Computer Ability

Do you currently use a Macintosh computer, either at work, home, or elsewhere?

Yes 97%
No 3%

How would you classify yourself in terms of your personal-computer abilities?

Beginner
Intermediate user
Advanced user
Computer professional



Figures are based on 596 respondents to a 1992 Macworld mail-in subscriber News survey. Multiple responses were allowed.

Faster 882MB Optical Drive

MICRONET Technology has begun shipping the SB-TMO-1000, a second-generation erasable optical drive with an average access time of 35ms. The 5¼-inch drive uses 1GB cartridges with a formatted capacity of 882MB. It has a data-transfer rate of higher than 900K per second over SCSI, MicroNet said.

Based on the Tahiti II drive mechanism made by Maxoptix, the SB-TMO-1000 is designed to be backward-compatible with the more common ANSI/ISO 650MB erasable optical drives from a number of companies. The retail price of the SB-TMO-1000 is \$5345. MicroNet, 714/837-6033.—T.M.



DOROTHY CARICO SMITH

Where the Time Goes

Timeslips Corporation, which publishes the time-billing package Timeslips, is developing LapTrack for analyzing how you use your time.

LapTrack sports some features designed for PowerBook-toting business travelers—in particular, its ability to upload, to a server back at headquarters, details on how you spend your time on the road. Managers can slice and dice the database to create graphs and reports showing budgeted versus actual expenses, who is racking up the highest percentage of billable hours, which types of clients are the most profitable, and so on. It can read data from a Sharp Wizard or CE Software's Alarming Events (Timeslips plans to add other filters later).

LapTrack will probably list for about \$80 for one user. Timeslips, 508/768-6100.—D.L.

News

Asanté's Serverless Messaging

PersonToPerson from Asanté Technologies is network communications software that, among other things, supports the exchange of voice messages and text files without requiring a dedicated server. Intended to be used by departments and workgroups, the software includes an in/out board, monthly and daily calendars, and a customizable screen saver.

PersonToPerson has begun shipping at suggested retail prices of \$149 for a two-user package, \$399 for a ten-user package, and \$699 for a package that supports a network zone. Asanté, 408/752-8388.—T.M.



BETA WAIT

Long-awaited products

ACIUS's 4D Server

Shown publicly January 1991. Current ship date projected: end of summer 1992.

FoxPro/Mac

Discussed publicly winter 1990/91; not in beta as of May 1992. Fox says will ship in 1992.

Interleaf 5

Discussed publicly October 1990. No ship date projected.

AEC's FilePower

Announced August 1991; planned to ship winter 1991/92. Ship date not set; may be ready to show August 1992.

CA-Cricket Graph 2.0

Announced in January 1992. Current ship date projected: August 1992.

Clariss's MacWrite Pro

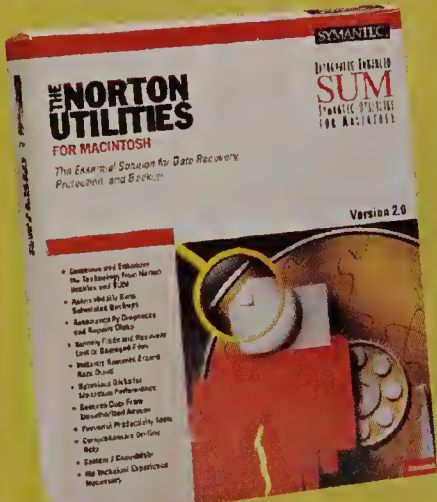
Announced spring 1991. Current ship date projected: late summer 1992.

MacWAREHOUSE®

1-800-255-6227

ORDER
UNTIL
MIDNIGHT(EST)
FOR
OVERNIGHT
DELIVERY

OVERNIGHT
DELIVERY
ONLY \$3.00



The Norton Utilities for Macintosh 2.0

⑦ The Norton Utilities for Macintosh 2.0 combines and enhances the features from two award winning products: SUM II and Norton Utilities. The combination of these two products results in the first Macintosh utility software package to offer fully integrated advanced disk repair & recovery, automatic backup, data security, productivity tools and system enhancements in one informative, easy-to-use product. This unbeatable combination allows you to protect valuable data and make day-to-day functions a breeze. Whether working on your Macintosh at home or while networked into a corporate-wide system...if you own a hard drive, the Norton Utilities for Macintosh 2.0 is the product for you.

Publisher: Symantec UT10151

\$95

OPTIMA™ 96 or OPTIMA™ 24*

OPTIMA™ 96 or OPTIMA™ 24 for the Macintosh - Low-cost, high-performance 9600 and 2400 bps modems provide the latest error-control and data compression technology for maximum data throughput. In addition to V.32/9600 bps transmissions, OPTIMA 96 provides 38,400 bps throughput and OPTIMA 24 provides 9600 bps throughput. OPTIMA modems practically operate without you! Automatic Feature Negotiation creates the most efficient combination of speed, error-control, and compression every time. OPTIMA 96 and OPTIMA 24 - More modem for your money. **Manufacturer: Hayes** OPTIMA 96 MOD0077 \$399.

OPTIMA 24 MOD0096

\$149*



FontBank PostScript Display Typefaces

The FontBank PostScript Display Typefaces give you a library of 250 Type 1 postscript display typefaces. Build a versatile type library with designs ranging from the simple sans serif to the extreme ultra serif. Use them to create attention-getting headlines, sub-headings, titles, logos and special text effects. Included in the package are traditional, decorative, novelty, script, brush and calligraphic faces. Use these faces as a counterpoint to regular text or with design programs. FontBank allows you to obtain a large library of high-quality Type 1 PostScript display faces, which are compatible with all Mac applications. With FontBank fonts, you get full-featured screen and printer fonts at an affordable price. **Publisher: FontBank** FON0438

\$95

NEW

Hard Disk ToolKit® Personal Edition

⑦ Improve performance and make any drive System 7 compatible. Powerful, easy to use, affordable version of FWB's acclaimed utilities that format and partition all popular SCSI hard drives, removable and optical drives. Password protection secures your files and extensive diagnostic testing ensures data integrity. Allows high performance driver updates on most devices without reformatting (Ideal for company-wide standardization). **Publisher: FWB, Inc.** UT10299



\$49

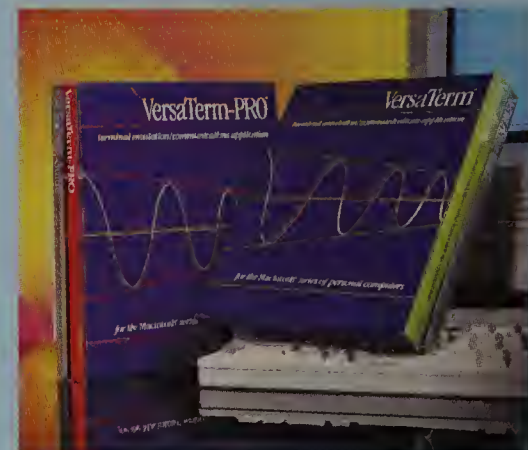
NEW

Capitalist Pig

⑦ New! Animated business simulation game challenges you to build and run your own business under authentic economic conditions. Experience the challenge of business, scandals, fires, terrorists, and more, as you battle for billions—or bankruptcy. Make crucial business decisions every minute, and enjoy the results—or suffer the consequences. Packed with sound, animation, and fun, it draws rave reviews from would-be entrepreneurs of all ages. Capitalist Pig is the must-have "Game of the Year". You never knew business could be so stimulating! **Publisher: Pluma Software** ENT0447



\$35



Versa Term-PRO 3.6 or VersaTerm 4.6*

⑦ VersaTerm-PRO 3.6 and VersaTerm 4.6 emulate the following terminals: DEC VT220 and VT100, DG D210 and D211, plus Tektronix 4014 and (with Pro only) Tektronix 4105. They support multiple-sessions via the Apple Comm Toolbox, and come with a complete set of tools and INITs: MacTCP (TCP/IP), Telnet and FTP (Client & Server), SLIP (Serial Line Internet Protocol), LAT (DEC VMS Ethernet), ADSP (AppleTalk Data Stream Protocol), plus serial and modem tools. File transfer capability includes: FTP, XModem, YModem, and Kermit. Both products support System 7.0, and work over LocalTalk, Ethernet or serial connections. **Publisher: Synergy Software** Versa Term Pro 3.6 COM0003 \$177.

Versa Term 4.6 COM0002

\$90*

WindoWatch

⑦ Track the hours you spend on a project with WindoWatch. It's a must for professionals who bill their services by the hour (or minute). WindoWatch operates in the background, automatically generating a timesheet as you work. Use WindoWatch to collect and merge timesheets from team members over the network or export timesheet information to a spreadsheet. Don't miss any opportunity to accurately bill your clients. After all, time is money.

Publisher: ASD Software UT10264

\$89



NEW



StuffIt Deluxe 3.0 or StuffIt SpaceSaver*

⑦ **StuffIt Deluxe 3.0** is the "Complete Compression solution". Only StuffIt Deluxe 3.0 can solve all your compression needs from archiving to transparent compression and includes StuffIt SpaceSaver. StuffIt Deluxe 3.0 is the fastest most efficient compression product available. Our new Add Match intelligently stuffs only the files that meet the criteria that you specify. **UT10302 \$69.**

StuffIt SpaceSaver

⑦ Unlike other compression products, **StuffIt SpaceSaver** increases disk space (with lightning speed) without effort on your part. Have it work while your Mac is idle or when you say "Compress this for me." SpaceSaver provides complete on-the-fly compression in one package. SpaceSaver is also one of the least expensive, most productive and easiest to use compression products available.

Publisher: Aladdin Systems, Inc. UT10303

\$35*

FREE!

POWER USER'S TOOL KIT 9.0

Power User's Tool Kit 9.0 is full of useful productivity enhancers and software to protect your data from viruses. A powerful collection of 6 programs, the Tool Kit 9.0 includes 2 programs designed to take advantage of System 7*. Here's what awaits you...

Carpetbag makes resources, (fonts, sounds, FKEYS, keyboard layouts), available on your Mac without having them installed in your System file.

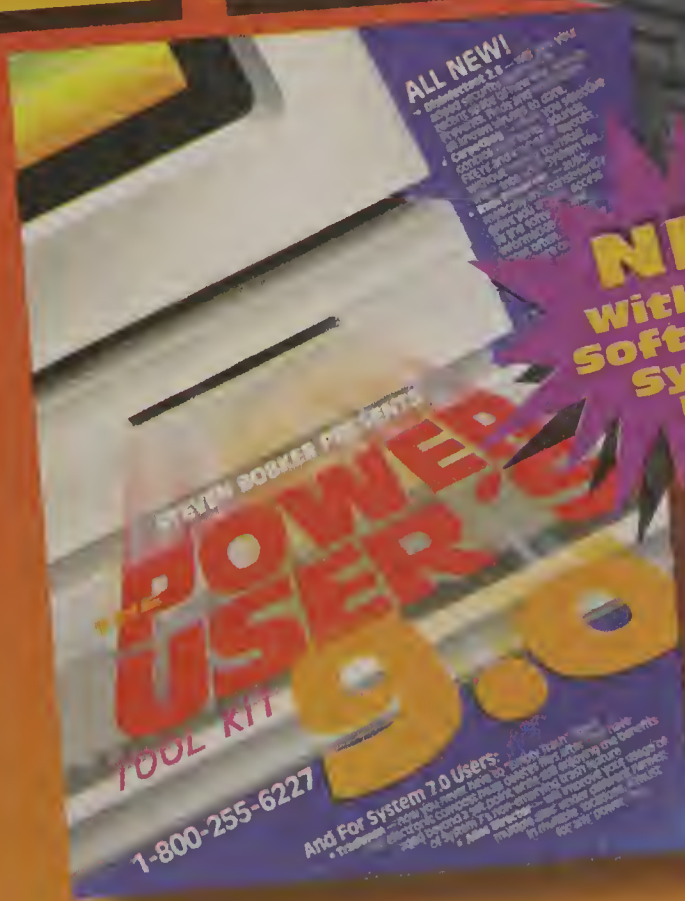
The Complete Delete overwrites space on a disk where a deleted file was and makes any sort of snooping in your deleted files impossible.

Disinfectant 2.8 can prevent, find and eradicate all of the newly discovered Mac viruses.

Ram Preserves automatically and consistently loads any Mac RAM disk with selected files each time you start up.

Alias Director is the most powerful System 7 alias management tool available.

TrashMan automatically deletes files from your Trashcan after they have aged as long as you specify.



NEW!
With Bonus
Software for
System 7
Users!

The Power User's Tool Kit 9.0

is **FREE** when you order from MacWAREHOUSE. You pay only \$1.50 for shipping and handling. If you would like the disk, please ask for Item #AAA0022.

* All Software works with System 7, two programs are designed to take advantage of its new features.

Some of the programs are Shareware so you can try them free of charge. To continue using them, some authors ask that you pay a small fee (\$5-\$10). Two of the programs are absolutely FREE! The details are explained on the disk, which is yours to keep, with our compliments.



CPU Connectix PowerBook Utilities

Put more power into your PowerBook!

Get even more from your PowerBook with Connectix PowerBook Utilities (CPU), the first software utility created exclusively for your PowerBook. CPU extends your battery life! That keeps your PowerBook up and working longer. CPU protects your sensitive data whether your PowerBook is running, shut down or asleep. Custom menu bar displays show accurate battery level, remaining battery life, date and time. CPU gives you much more. Instant sleep and wake, LCD screen saver, keyboard shortcuts, cursor finder, mouseless menu control and over a dozen other enhancements make your PowerBook more effective. Get the power of CPU and put more power into your PowerBook today. **Publisher: Connectix UT10297**

\$49

Wallpaper

Put some pizzazz on your monitor and watch it come to life. With the prize winning Wallpaper decorator program for your desktop, you can jazz up your screen with large patterns (up to 128x128 pixels square) in up to 256 colors per pattern, grayscale or black and white. Includes hundreds of desktop patterns, or create your own with

Wallpaper's expanded tools. Just drag and drop patterns into place and try creation after creation. You can set Wallpaper to change patterns among your favorites and can create new patterns from any format. It's fun!

Publisher: Thought I Could GRA0302



\$37

I'm Kerry, call me at:

MacWAREHOUSE®
1-800-255-6227

(1-800-ALL-MACS)

Inquiries: 908-367-0440

FAX: 908-905-9279

Call 24 hours a day, seven days a week.

NEW! Express Customer Service Number:
1-800-445-9677

Midnight Express service available weekdays.



IntelliDraw

Aldus IntelliDraw defines an exciting new category of drawing program, with intelligent features that give you an easy new way to visually experiment, refine, and draw your ideas. Innovative smart tools link graphics in your drawing so they respond to changes automatically. Create visual "what-if" scenarios with features like intelligent clip art & templates, automatic symmetrical objects, and dimension lines. Auto-alignment, shape blending, powerful text handling capabilities, unlimited layers, color gradients, standard draw tools and more.

Publisher: Aldus GRA0354



\$199

We carry more than 2000 Macintosh products, including all the latest releases and new versions. We pride ourselves on getting new products first. Just fill in the information requested below and mail the coupon. We'll start your free, one-year subscription to the MacWAREHOUSE catalog with the next issue.



FREE CATALOG SUBSCRIPTION MWK2

Free MacWAREHOUSE Catalog Subscription

1690 Oak Street, P.O. Box 3031, Lakewood, NJ 08701

Please enter my free, one-year subscription to the MacWAREHOUSE catalog

Name _____

Address _____

Apt. _____

City _____

State _____

Zip _____

(Expect to receive your first issue within 4-6 weeks.)

MacWAREHOUSE

1-800-255-6227

GUARANTEE

Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.

ACCESSORIES

CD Technology, Inc.	
ACC0763 CD ROM Caddy Replacement	49.
Fuji USA	
BND0077 MF2DD 100PK Disks w/Labels	59.
BND0076 MF2HD 50PK Disks w/Labels	59.
I/D Design, Inc.	
ACC0528 Ultimate Classic SE Carrying Case	65.
LB Innovators	
WristSaver/MousePad Bundle (various colors)	ea.25.
WristSaver Mini-Mouse Pad (various colors)	ea.12.
Kensington	
ACC0676 NoteBook Traveler-Compact	55.
MediaMate	
ACC0744 3.5in. Flex-Pack-10	10.
ACC0738 DataFinder 3.5" Disk Filing System	10.

BUSINESS & PRESENTATION

A Lasting Impression	
ResumExpert: Word 30/4.0 version, Cover Letters, Manager, Sales & Marketing, Students, Computer Science & Engineering, Financing & Banking	ea.49.
Abacus Concepts	
STA0032 StatView 4.0	369.
STA0010 StatView SE+Graphics 1.03	219.
STA0028 StatView Student	75.
STA0030 Super ANOVA	369.
After Hours Software	
BUS0222 DateBook	79.
DAT0076 TouchBASE 2.0	79.
Aldus	
BUS0066 Persuasion 2.1	325.
ASD Software, Inc.	
BUS0207 Active Memory 2.0	125.
Attain Corporation	
BUS0211 IN CDNTROL 1.0	89.
CE Software	
BUS0135 Alarming Events	84.
GRA0070 CalendarMaker 3.0.1	31.
Chena Software, Inc.	
BUS0250 Fair Witness 1.2	195.
Claris	
BUS0201 ClarisWorks	199.
DAT0064 FileMaker Pro	199.
UPG0005 FileMaker Pro Upgrade	95.
BUS0178 Resolve 1.1	SPECIAL 129.
Data Description	
STA0012 Data Desk 3.0	459.
Fisher Idea System, Inc.	
BUS0168 IdeaFisher 2.0	389.
JAM Software	
DAC0033 SmartAlarms 3.1 Plus Pack/Appt.Diary	89.
Kaetron	
BUS0218 FlowChart Express	93.
BUS0100 TopDown 3.0	199.
Lotus Development Corporation	
BUS0188 Lotus 1-2-3 for Macintosh	339.
SID0004 Lotus 1-2-3 Competitive Upgrade	105.
Meca	
FIN0039 Managing Your Money A.Tobias 5.0	39.
Microsoft	
BUS0223 Microsoft Excel 4.0	295.
UPG0010 Microsoft Excel 4.0 Upgrade	99.
BUS0008 Microsoft PowerPoint 2.01	245.
BUS0181 Microsoft Project 1.1	445.
BUS0186 Microsoft Schedule+ 5 Pack	125.
BUS0243 Microsoft Works 3.0	159.
BUS0241 The Microsoft Office 2.5	499.
Palo Alto Software	
FIN0116 Business Plan Toolkit 4.0	99.
Pastel Development Corporation	
BUS0199 DayMaker	65.
Power Up	
BUS0153 Address Book Plus 2.0	63.
BUS0073 Calendar Creator	44.
Round Lake Publishing	
Legal LetterWorks or Sales	ea. 45.
BOK0007 LetterWorks	45.
Softsync Publishing	
FIN0048 Accountant, Inc. 3.0.1	335.
Symantec Corporation	
BUS0217 GreatWorks 2.0	139.
BUS0055 More 3.1	265.
Synergy	
STA0018 Kaleidagraph 2.1	149.
Teleware, Inc.	
FIN0087 M.Y.O.B. 3.0	139.
Visionary Software	
BUS0190 First Things First 2.1	45.

COMMUNICATIONS & NETWORKING

Apple Computer, Inc.	
NET0250 AppleShare 3.0	1059.
COM0131 AppleTalk Remote Access	175.
COM0126 Macintosh PC Exchange	69.
Argosy	
COM0098Run PC/Network	279.
COM0103Run PC/Remote	139.
CE Software	
COM0101 QuickMail 2.5.1 (1-5 users)	249.
Dayna Communications, Inc.	
NET0125 DaynaPDRT E/Z	275.
NET0076 DaynaPORT E/SE	149.
Ex Machina	
COM0111Notify! 1.1 Personal Edition	109.
Farallon Computing	
NET0007 PhoneNET® Plus, SE & II	31.
NET0019 PhoneNET StarController®	899.
NET0122 Timbuku® 4.0.3	129.
NET0034 Timbuku/Remote® 3.0	129.
FreeSoft	
COM0060 White Knight V 11	85.
Insignia (Full line available)	
COM0107 Soft PC Universal 2.5	195.
Hayes	
COM0095 HayesConnect 3.0	75.
Synergy	
COM0002 VersaTerm 4.6	90.
COM0003 VersaTerm Pro 3.6	177.
TechWorks	
NET0133 GraceLAN 2.0 50-user	285.
White Pine Software	
COM0118 eXodus 4.0	189.

COM0114Mac 320-VT320 Emulator	95.
-------------------------------------	-----

DESKTOP PUBLISHING

Aldus	
DTP0072 PageMaker 4.2	495.
DTP0080 Personal Press 2.0	99.
Quark, Inc.	
OTP0071 XPress 3.1	549.
Xerox Imaging Systems	
DTP0039 Accutext 3.0	639.
DISK DRIVES & BOARDS	
Mass MicroSystems	
DRI0253 DataPak 45MB Removable	589.
DRI0254 DataPak ILC	669.
Peripheral Land, Inc.	
DRI0375 Infinity 88 Removable single	749.
DRI0115 Infinity Turbo 40 Meg Removable	599.
PowerUser®	
DRI0533 20mb External Hard Drive	299.
DRI0534 52mb External Hard Drive	379.
DRI0550 80mb External Hard Drive	449.
SuperMac Technologies	
DRI0437 Spectrum/8.24 PDO	899.
DRI0516 Spectrum/24 Video Mac II Card	799.
DRI0517 Spectrum Series III Accelerator Card	449.
Spectrum/Bsi or Series III	539.

EDUCATIONAL & ENTERTAINMENT

Artworx	
ENT0262 GrailQuest	19.
ENT0303 Bridge 6.0	29.
Baseline Publishing	
ENT0403 Talking Moose/Carroll Carnival 4.0	23.
Broderbund	
CDR0042 Just Grandma and Me-CD-ROM	35.
GRA0268 Kid Pix 1.2	35.
Centron Software, Inc.	
ENT0329 BlackJack Strategy Tester/BlackJack Ace	65.
ENT0289 CasinoMaster Deluxe Color Version	45.
ENT0440 Crossword Creator	39.
HyperGlot Software Company	
Word Torture: Spanish, French, German, Russian ea	35.
MECC	
ENT0381 The Oregon Trail	29.
Number Munchers or Word Munchers	ea. 29.
Nordic Software	
EDU0276 Word Search Deluxe	35.
EDU0142 Preschool Pack 2.0	35.
Dpcode Systems, Inc.	
MUS0107 Audioshop	65.
Optimum Resource, Inc.	
EDU0355 Stickybear's Reading Room	35.
Penton Diverseas (Full line available)	
Picture It! Level I: Spanish, German, French, Italian	ea. 42.
VocabuLearn/ce Level I, II or III: French, German, Hebrew, Italian, Japanese, Russian or Spanish	ea. 35.
Personal Training Sys. (Full line Avail)	
Macintosh, HyperCard, FileMaker Pro, Microsoft Excel 4.0, Microsoft Word 5.0, Aldus PageMaker 4.0, Aldus FreeHand, Aldus Persuasion, Quark XPress 3.1	ea. 49.
Pluma Software	
ENT0447 Capitalist Pig 1.1	35.
Softsync Publishers	
EDU0346 Expert Astronomer	29.
Software ToolWorks	
MUS0092Miracle Piano	349.
Triad	
ENT0401 Complete Lottery Tracker/Wheeler 4.0	29.
XDR Corporation	
ENT0274 MacGolf Classic 1.1	52.
Zondervan Publishing House	
MacBible-Greek or NIV	ea.79.
BDK0021 MacBible - King James Version	79.

Fonts & Applications

Adobe Systems, Inc.	
FDN0351 Adobe Type On Call 2.0	59.
FDN0295 Adobe Type Reunion	41.
Bitstream	
FDN0475 Type Essentials-Letters, Faxes, Memos	75.
Font Bank	
FON0438 Postscript Display Typefaces	95.
Softkey Software	
FON0480 KeyFonts	49.

GRAPHICS & MULTIMEDIA

Abracadata	
CAD0032 Design Your Own Home-Architecture	ea.59.
GRA0339 Sprout!	45.
Adobe Systems, Inc.	
GRA0304 Adobe Premiere	305.
DTP0054 Illustrator 3.2 (w/ ATM 2.0)	369.
GRA0191 PhotoShop 2.0	549.
Aldus	
GRA0092 Digital Darkroom 2.0	259.
GRA0305 FreeHand 3.1	395.
GRA0279 Gallery Effects Vol. I	129.
GRA0354 IntelliDraw	199.
GRA0131 Super 3D 2.5	325.
HYP0027 SuperCard 1.6	195.
GRA0112 SuperPaint 3.0	133.
Apple Computer, Inc.	
GRA0347 QuickTime Starter Kit	169.
Claris	
CAD0029 ClarisCAD 2.0	599.
GRA0350 MacDraw Pro 1.5	275.
Deneba	
GRA0280 Canvas 3	249.
DIVA Corporation	
GRA0328 DIVA VideoShop	395.
Dream Maker	
GRA0105 Clippures Vol. 1 Business Images	69.
Fractal Design	
GRA0323 Painter 1.2	285.
PC Globe	
GRA0245 MacGlobe	45.
GRA0246 MacUSA	39.
Metro Image Base (Full line available)	
GRA0277 Metro-ImageBasics	35.
Pixar	
GRA0288 MacRenderMan & Showplace Bundle	619.

Ray Dream	
GRA0291 JAG	79.
GRA0292 Ray Dream Designer 2.0	629.
Softsync Publishing	
GRA0318 ExpertColor Paint	29.
Specular International	
GRA0303 Infini-D 2.0	645.
T/Maker	
GRA0317 FaxMania, Business Fax Cover Sheets	25.
Thought I Could	
INP0206 Voice Impact Pro	37.
Virtus	
GRA0278 Virtus WalkThrough 1.11	309.

INPUT & OUTPUT

Appoint, Inc.	
INP0219 Mouse Pen Pro Mac ADB	65.
INP0220 Thumbelina Mac	65.
Articulate Systems	
INP0160 Voice Navigator II	599.
INP0206 Voice Impact Pro	199.
Caere	
INP0205 Typist Plus Graphics	459.
CoStar	
INP0196 AddressWriter Envelope Printer	479.
INP0194 Stringray Platinum	89.
Datadesk International	
INP0174 Mac 101E Keyboard Platinum	129.
Kensington	
INP0231 Turbo Mouse 4.0	109.
INP0221 NoteBook KeyPad	105.
Kurta	
INP0230 XGT 12X12 Pressure Sensitive w/Pen	779.
Microtek	
INP0180 Microtek ScanMaker 600ZS	1399.
INP0162 TrueLaser Printer	1399.
Microtouch	
INP0084 The UnMouse	159.
Mouse Systems	
INP0132 Little Mouse ADB	74.
INP0163 A3 Mouse	85.
INP0199 A3 Trackball	75.
Sharp (Full line available)	
CDMP023 Wizard Oz 8200 (128Kram)	299.
Sophisticated Circuits	
ACC0535 Power Key w/Quickkeys Lite 2.0	75.
INP0232 PowerPad	79.
SuperMac	
MON0224 20" SuperMatch Color Display	1799.
ThunderWare	
INP0116 LightningScan 400	369.
INP0189 LightningScan Pro 256	499.

UPGRADES & ACCELERATORS

Computer Care, Inc.	
DRI0336 Mac Rescue w/SCSI Port	195.
COM0074 BookRAM 6S for PowerBook	679.
DayStar Digital	
PowerCache 33 MHz	639.
PowerCache 33 MHz w/882	789.
PowerCache 40 MHz	879.
PowerCache 40 MHz w/882	1069.
DRI0421 FastCache IISI (64K)	319.
DRI0500 FastCache Quadra 700/900	279.
PowerUser®	
CHP0066 2MB PowerBook 100/140/170 Upgrade	149.
CHP0067 4MB PowerBook 140/170 Upgrade Kit	259.
CHP0068 6MB PowerBook 140/170 Upgrade Kit	359.
MODEMS & FAX	
Global Village	
MOD0086TelePort/Full FAX 2.0	219.
Hayes	
MOD0065 Bundle 9600 ULTRA SmartModem	699.
MOD0077 OPTIMA 96 for the Mac	399.
MOD0096 DPTIMA 24 Bundle	149.
PowerUser®	
MOD0062 24/96 Mini Send/Receive Fax Modem	199.
MOD0043 2400 Mini Modem	99.
MOD0071 9600 bps/V.32B.42bis Modem	399.
MOD0070 2400 bps/V.42bis Mini Modem	149.
Prometheus	
FON0084 Home Office 24/96	259.
MOD0085 Ultimate Home Office 24/96	489.

UTILITIES & PROGRAMMING

Abbott Systems, Inc.	
UTI0236 Calc+	39.
UTI0113 CanDpener 2	59.
Aladdin Systems	
UTI0145 Stuffit Deluxe 2.0	59.
UTI0303 Stuffit SpaceSaver	35.
Alsoft	
UTI0269 Alsoft Power Utilities Bundle	69.
Apple Computer, Inc.	
SYS0001 System 7 Personal Upgrade Kit	79.
ASD Software, Inc.	
UTI0135 FileGuard 2.7	139.
UTI0130 FileGuard 2.7 - Office Pack 5	479.
UTI0264 WindoWatch 1.52-Single	89.
Baseline Publishing	
UTI0187 Init Manager 1.1	34.
UTI0183 ScreenShot 1.2	34.
Berkeley System Design	
UTI0119 After Dark 2.0	29.
UTI0231 More After Dark/ After Dark 2.0 Bundle	45.
Caere	
UTI0293 OmniPage Direct	279.
Casa Blanca Works, Inc.	
UTI0273 Drive 7.2.2	49.
CE Software	
UTI0048 DiskTop 4.0	63.
Connectix	
UTI0297 CPU Connectix PowerBook Utilities	49.
Dantz Development	
UTI0246 DiskFit Pro	74.
UTI0227 Retrospect 1.3	147.
UTI0196 Retrospect Remote	264.
Essential Software	
UTI0292 Easy Alarms 2.0	65.
FWB, Inc.	
UTI0259 HardDisk ToolKit 1.1	125.
Insight Development	
UTI0098 MacPrint 1.3	95.
Insignia Solutions	
UTI0174 AccessPC 2.0	60.
Kent Marsh	
UTI0212 FolderBolt	75.
Microcom	
UTI0093 Virex 3.6	69.
MicroMat Computer Systems	
UTI0285 MacEKG 2.0	99.
Nova Development Corporation	
UTI0281 Kaboom!	29.
Salient	
AutoDoubler or DiskDoubler 3.7	ea.49.
Symantec Corporation	
UTI0151 Norton Utilities for the Mac 2.0	95.
UTI0214 Symantec Antivirus for Mac 3.0 (SAM)	65.
LNG0051 THINK C 5.0	199.
Teknosys	
UTI0251 Help 1.02	89.
UserLand Software, Inc.	
UTI0272 UserLand Frontier	189.
WORD PROCESSING	
Caere	
UTI0202 OmniPage Professional	649.
Calera	
UTI0215 WordScan	189.
Claris	
WRD0026 MacWrite II 1.1	89.
Microsoft	
WRD0050 Word 5.0	295.
UPG0001 Word 5.0 Upgrade	125.
Sensible Software	
SPL0018 Sensible Grammar 2.1	55.
Softsync Publishing	
WRD0057 ExpertWriter	29.
TGS Systems	
LNG0053 Prograph 2.5 Compiler Ver.	309.
T/Maker Co.	
WRD0051 WriteNow 3.0	159.
WordPerfect Corporation	
WRD0041 WordPerfect 2.1	289.
WordStar	
SPL0030 American Heritage Electronic Dictionary	55.
SPL0028 Correct Grammar 3.0	49.

- All major credit cards accepted. No surcharge.
 - Your credit card will not be charged until your order is shipped.
 - If we ship a partial order, we pay the freight on the remaining portion.
 - All U.S. shipments are insured at no extra charge.
 - C.O.D. orders accepted (add \$6.00 including shipping) - \$1,000 maximum.
 - Cash, money order, or cashier's check.
 - Corporate purchase order accepted subject to credit approval.
 - All products are covered by a 120 day limited warranty.
 - Sales Tax: CT residents add 6%, NJ residents add 7%, Ohio residents add appropriate tax.
- SHIPPING**
- All orders add \$3.00 per order. We ship Airborne Express overnight unless UPS Ground delivers overnight. (Some rural areas require an extra day.)
 - Orders placed by 12:00 MIDNIGHT (EST) (weekdays) for "in stock" items ship same day (barring system failure, etc.) for overnight delivery.
 - C. O. D. orders ship via UPS (Blue Label if you are more than 2 days from us via UPS Ground). Charge is \$6 including shipping.
 - Alaska, Hawaii, outside continental U.S., APO/FPO call 908-367-0440 for information.

*Defective software replaced immediately. Hardware replaced or repaired at our discretion. **We regret that we cannot be responsible for typographical errors.

I'm Kerry, call me at:

MacWAREHOUSE
1-800-255-6227
(1-800-ALL-MACS) Now works in Canada.

Inquiries: 908-367-0440 FAX: 908-905-9279 (NOTE NJ AREA CODE)

1690 Oak Street, P.O. Box 3031
Lakewood, NJ 08701

NEW! Express Customer Service Number:
1-800-445-9677

For faster service for existing customers our computers recognize incoming calls by the telephone number and instantly locate your records.



COMPUSERVE

You can now contact MacWAREHOUSE or place orders with us in the Electronic Mall on Compuserve. The MacWAREHOUSE GO code is GO MW.

As always, you'll get fast, dependable overnight service and you can leave messages for Kerry or any of our support staff.

**OVERNIGHT
DELIVERY
ONLY \$3.00**



DiskTop goes System 7!

Find faster, launch lots and manage more with DiskTop, the System 7-compatible file management utility from CE Software! Find files faster, as you can search based on file name (or part), size, type, creator, when created or modified. If DiskTop can't find it, it ain't there! Once you've found what you're looking for, use the powerful copy, move, delete or rename functions to keep everything organized and up-to-date. All done in one window and without leaving your current application! And, when it's time to launch another program, don't quit or go to the finder-launch any application from your DA menu with DT Launch (included free with DiskTop). If you have a hard drive, DiskTop is a must! UTI0048

\$63

From QuickKeys™ and DiskTop™ adding power to your desktop, to QuickMail™, helping you to communicate regardless of platform.

We can help you do whatever you do, better. How do we know this? Simple.

Improving your environment is our business™.

Publisher:



CE SOFTWARE

NEW



PowerPad

On the road or at your desk, PowerPad™ turns your PowerBook into a numeric powerhouse. With advanced ergonomics for comfortable and accurate entry. Function keys at a touch. Customizable keys to match your way of working. And a hard cover that opens to support the pad for easy use. A new desk accessory, 10Key Tape, gives a paper tape work record. There's an extra ADB port for adding a mouse or other device. And a 24" removable cable. It's the number cruncher's dream - PowerPad. PowerPad is also available with QuickKeys2, the popular macro utility program.

Manufacturer: Sophisticated Circuits
PowerPad with QuickKeys2 INP0233 \$119.

PowerPad INP0232

\$79



Business Plan Toolkit 4.0

Use Business Plan Toolkit to build plans you'll be proud to present to banker, buyer, or boss. It's complete with prompted textwriter, and good estimates of cash flow, P&L, ratios, sales, personnel plan, fully-linked financials, and business charts all clearly

explained in a manual that MacUser called, "excellent". Business Plan Toolkit takes you step-by-step with your own words. Supports Microsoft Excel, Works, WingZ, Resolve, and most Mac word processors. System 7.0 compatible. Rated 4 1/2 nice by MacUser. Publisher: Palo Alto Software FIN0116



\$99

TouchBase 2.0 or DateBook

TouchBase 2.0 stores information about personal and business contacts. Automatically capitalizes words and formats phone numbers. It has fields for storing alternative phone numbers, and you can customize the fields. TouchBase prints envelopes and mailing labels, including postalbar codes, plus many other useful forms. DAT0076



DateBook is the ultimate personal time manager for Macintosh. Instant access and advanced scheduling keeps you on top of your appointments and things to do. DateBook makes it easy to plan your life. It shows your schedule in multiple formats including test, Gantt chart and time bar. DateBook's views enable you to see your schedule in as much detail as you like as quickly as possible. TouchBase and DateBook Bundle BUS0253 \$129. Publisher: After Hours Software

Datebook
BUS0222

\$79 ea.

After Dark/More After Dark Bundle*



After Dark 2.0 displays over 35 screen savers including the classics, such as Flying Toasters and Fish!. Also features sound, password protection, MultiModule, logo and message display. UTI0119 \$29.

It's MAD! It's More After Dark - Over 25 incredible displays for After Dark, the Ultimate Screen Saver. Features contest winners; Mowin' Man, Tunnel, GraphStat, many beautiful new Fish!, Kittens, Art Museum, and Lunatic Fringe game module help save you screen form phosphor burn-in. (Requires After Dark.) Publisher: Berkeley Systems UTI0230 \$25.

More After Dark Bundle

Buy both and save.
UTI0231

\$45*



FileGuard

"It's about as much software-based security as you can get in one package." MacUser, March 1992. Protect your hard drive from unauthorized access (including security bypass with a system diskette), copying and erasure;

applications and file/folders (including System folder) from unauthorized access, deletion, and/or illegal copying; desktop from alterations by unauthorized users. Keep an eye on System usage with FileGuard's Users Log which continuously tracks user/group activity. System 7.0 Compatible. Publisher: ASD Software Single UTI0135



\$139

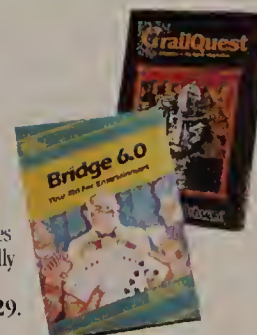
Bridge 6.0 or Grail Quest*

Bridge 6.0

Now you can play a rubber of Bridge 6.0 with the Mac's three players. Bid with either the Stayman or Blackwood conventions. Bridge 6.0 handles all the bookkeeping and tactfully informs you of any mistakes in bidding or play. ENT0303 \$29.

Grail Quest

Uses the Mac's sounds and graphics to put you inside the world of King Arthur's England. Best of all, its well-crafted plot and authentic settings are based on authentic tales of time by Geoffrey of Monmouth and Sir Thomas Malory. Publisher: Artworx ENT0262



\$19*

MacWAREHOUSE®

1-800-255-6227

ORDER
UNTIL
MIDNIGHT (EST)
FOR
OVERNIGHT
DELIVERY

OVERNIGHT
DELIVERY
ONLY \$3.00

MacEKG 2.0

MacEKG can warn you of computer failure BEFORE it happens. EKG monitors over 250 aspects of your system—logging and comparing results each time you reboot. EKG features advanced chip-level tests that were only available to Authorized Apple Technicians until now. Using EKG's Reactivator to continuously reboot simulates several days of heavy use to quickly diagnose intermittent failures. EKG can automatically run at startup or shutdown—making sure you are the first to know if your computer has failed a test or slowed down.

Publisher: MicroMat UTI0285



\$99

Infini-D 2.0

Create dazzling images with the power of Infini-D's Three-dimensional environment. The easy-to-use Infini-D, now in an awesome second generation! Infini-D 1.0 was the package that brought 3D graphics to the rest of us. Infini-D 2.0 combines this friendly interface with sizzling 3D power: Infini-D's incredible new shader and raytracer now can render scenes up to 500% faster! Instant conversion of EPS files into 3D objects, Infini-D's awesome metamorphosis capabilities, precise PICT mapping control, and extensive QuickTime support make Infini-D 2.0 the 3D package of choice for graphic arts and multimedia professionals.

Publisher: Specular International GRA0303



\$645

MacPrint 1.3

Use a Macintosh with non-Apple printers. Print Mac applications on HP Laserjet, Deskjet or compatible printers including all Series IIs, IIsx and the Deskjet 500. Prints text and graphics at the printer's maximum resolution.

Does not require PostScript.

Cable is included. Publisher: Insight Development UTI0098

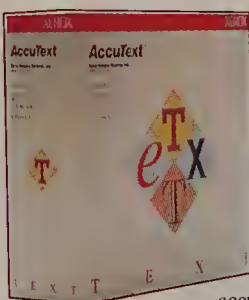


\$95

AccuText 3.0

Enhanced accuracy through Verification. AccuText 3.0 is Intelligent Character Recognition (ICR) software that allows scanned documents to be recognized and captured to electronic files. AccuText's interactive Verifier increases speed and accuracy by inviting user interaction

before processing. AccuText features include System 7 compatibility, format retention, automatic halftone removal, on-screen zoning, support for ten languages, and compatibility with most popular scanners and software applications. Publisher: Xerox Imaging Systems DTP0039



\$639

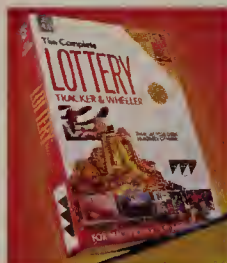
Kaboom!

Add more than 150 wild and wacky sounds to your Macintosh with Kaboom! Each sound can be played every time you start up your computer, insert a disk, empty the trash, and more! Amaze your friends with the sounds of traffic jams, screams, and ringing phones—even famous dialogue from "Twilight Zone," "I Love Lucy," Ronald Reagan, and more! With Kaboom! you'll never have to settle for a simple "beep" again! Publisher: Nova Development Corporation UTI0281



\$29

Complete Lottery Tracker and Wheeler 4.0



The most comprehensive lottery software package and NOW works with the new "Powerball" games and Pick-5, Pick-6, and Pick-7 lotto games. Choose up to 80 numbers, analyze and choose numbers from past drawings, create tickets through wheeling, record bets to check for later winners, and print charts—all to help you

beat the odds. Comes with the FREE audio cassette, Lottery Winning Strategies and a FREE lottery database of the last 12 months winning numbers from the state of your choice when sending in an enclosed card.

Publisher: Triad Publishing, Ltd. ENT0401

\$29

Crossword Creator or CasinoMaster

Crossword Creator

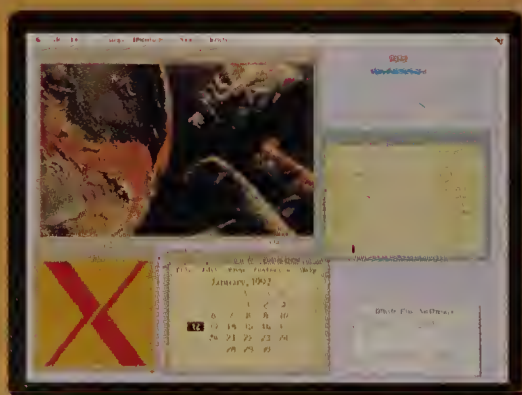
Create crossword puzzles quickly and easily on your computer. Just type in the words and Crossword Creator will instantly generate the puzzle. Build your own dictionaries and use them for future puzzles. Includes Roget's II, The New Thesaurus, with wild card search features. Save options include desktop publishing files. ENT0440 \$39.

CasinoMaster CasinoMaster offers all the fun of playing the odds in Las Vegas, without the risks. This integrated package realistically simulates the five most popular casino games—Blackjack, Craps, Roulette, Poker, and Baccarat.

Publisher: Centron Software ENT0277



\$39



eXodus

eXodus™ 4.0

eXodus™ 4.0 window display software package enhances the friendly Macintosh environment by giving full X server capabilities to users running either Mac OS or A/UX. It runs on all Macs with at least 2MB of RAM—Classic to Quadra—is System 7 and Multifinder compatible. Comes complete with all networking software required for DECnet, TCP/IP, and AppleTalk connections and provides built-in FTP file transfer support. It fully supports the ICCM standards, allowing users to copy and paste text and graphics between the Macintosh and X environments, and offers a variety of printing options. Monochrome as well as color X screens are supported with three window management options: Rooted (remote), and Rootless (Macintosh or MOTIF). All you need beyond eXodus is a Macintosh with a network connection!

Publisher: White Pine Software COM0118

\$189



WristSaver/WristSaver MousePad or WristSaver Mini-MousePad*

WristSaver/WristSaver Mousepad The WristSaver cradles your wrist with a contoured neoprene rubber pad and a washable nylon covering. It's ergonomically designed to support your wrist at the proper angle to help avoid the pain associated with Carpal Tunnel Syndrome. The WristSaver Mousepad provides a comfortable rest for your wrist, plus a conventional mouse pad. Four colors to choose from. **WristSaver Mousepad \$15ea. WristSaver \$15ea. WristSaver Bundle \$25.**

WristSaver Mini-Mousepad* The WristSaver Mousepad's success prompted the WristSaver Mini-Mousepad. At only 5" wide x 8.5" long it is 3" smaller than the original. Your precious desk space is saved and your wrists will thank you.

Manufacturer: LB Innovators

Navy: ACC0757 or
Red: ACC0758 or
Black: ACC0759 or
Gray: ACC0760

\$12*

POWER USER SIMMS ONLY

\$39*

FREE!

STEP-BY-STEP
VIDEO
INSTRUCTIONS**



A Power User Memory Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable overnight service will have your Kit in your hands tomorrow!

MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spreadsheet. Install extra memory and you can leave a letter open while you refer to last month's sales figures.

You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. You'll find installation at home easy when you follow our FREE** step-by-step installation video instructions. Just open your Mac, slide out the main circuit board and plug in your SIMMs.

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2 @ \$39 ea.)

The chart explains exactly what you need to achieve the desired level of performance.

To open your Mac Plus, SE, and Classics you'll need a specially designed tool — it's available from us as part of a handy tool kit for just \$9.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMs (Single Inline Memory Modules). Each one megabyte SIMMs card holds eight top quality,

To upgrade a 4-socket Mac Plus or SE to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 150ns or faster
2 MB	Remove all four existing 256k SIMMs, install two 1 MB SIMMs, leave two sockets for future expansion.
2-1/2 MB	Remove only two 256k SIMMs, install two 1 MB SIMMs.
4 MB	Replace all four 256k SIMMs with four 1 MB SIMMs.
To upgrade a 2-socket Mac Classic II or LC to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 100ns or faster
4 MB	Install two 1 MB SIMMs
To upgrade a 2-socket Mac LC II to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 100ns or faster
6 MB	Install two 1 MB SIMMs
To upgrade a 8-socket Mac II, IIx, IIcx, IIcx or SE/30 to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 120ns or faster
4 MB	Remove all four existing 256k SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256k SIMMs, install four 1 MB in remaining sockets.
8 MB	Remove all four 256k SIMMs, install eight 1MB SIMMs
To upgrade a 4-socket Mac IIsi to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 100ns or faster
5 MB	Install four 1 MB SIMMs
To upgrade a 4-socket Quadra 700 to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 80ns or faster
8 MB	Install four 1MB SIMMs
To upgrade a 16-socket Quadra 900 to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 80ns or faster
4 MB	Install four 1MB SIMMs
8 MB	Install eight 1MB SIMMs
12 MB	Install twelve 1MB SIMMs

memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung.

Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 120ns SIMMs is \$39.

Please call for the very latest prices and availability. Our sales staff will tell you what you need and help you make your choice an easy one.

SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100ns chip. The original Mac used relatively slow 150ns memory chips. The 68020 processor needs 120ns (or faster) chip, and the 68030 Macs like the speedier model.

OVERNIGHT DELIVERY

Install a MacWarehouse Expansion Kit and working with your Mac will never be the same! Call us now. We'll help you select just the right Memory Upgrade, and we'll ship it overnight for just \$3.

CHP 0012 120ns SIMMs.....\$39

MacWAREHOUSE®

1-800-255-6227

Overnight Delivery Only \$3.00!

Call 24 hours a day, 7 days a week

© 1992 MicroWarehouse Inc.

MACWAREHOUSE

30-DAY MONEY BACK GUARANTEE

If, for any reason, you are dissatisfied with your Power User Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return this product, postage paid, in its original condition, with the original packaging and documentation.

ONE YEAR WARRANTY.

MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion.

* SIMMs prices vary. Call for latest information.

** Limited Offer! Free video with purchase of 2 or more SIMMs

MWK2P

7 GREAT REASONS

1 Finder 7

The new Finder 7 is worth the cost alone. Access, organize, and view your folders, documents and applications faster and easier with the new improved finder.

2 Balloon Help

Use the new Balloon Help for interactive help while you work. Turn this feature on and point to anything on your screen - a menu item, icon, or tool - and a "balloon" appears, telling you what it is and what it does.

3 File Sharing

With the new File Sharing features you can share hard drives, folders, and files, with others on your network; it has never been easier. You can even set passwords so that only specific individuals or groups can see your files and work with them.

4 Fonts in System 7

Apple's new advanced font technology gives you clear, crisp type on screen in any size plus the ability to print to many different kinds of printers. No more struggle with font compatibility.

5 Multitasking

With System 7 Multitasking is always optional. Now you can run multiple applications at the same time, and switch from one to another with a click of the mouse. System 7 also supports background processing, so that while you're working in your word processor, you can print a document and have your spreadsheet recalculating.

6 System Folder Simplicity

Apple has completely redesigned and improved the System Folder, making it much easier to organize. Predefined subfolders are created automatically, to reduce clutter. The new System Folder includes a Control Panel Folder, Extension Folder, Apple Menu Folder, Preference Folder and Startup Folder.

7 Publish and Subscribe

You can "publish" any part of your document (a graphic, chart or piece of text), to another document even in another application - which "subscribes" to the original. Any changes you make to the original document will automatically appear in the other, even across a network. Now that's live copy and paste!

Plus Your FREE System 7 Tutorial from MacWAREHOUSE!

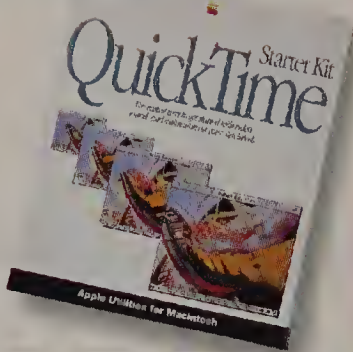
Video, sound, and animation on your Macintosh

QuickTime Starter Kit

Play QuickTime movies right on your Mac! Pause, fast-forward, rewind, advance frame by frame. Copy video and animation clips and paste them together. Transform still images and information into a single movie. Use a video-capture card and sound digitizer to record movies with the touch of a button. QuickTime brings Multimedia to the Mac!

GRA0347

Publisher: Apple Computer, Inc.



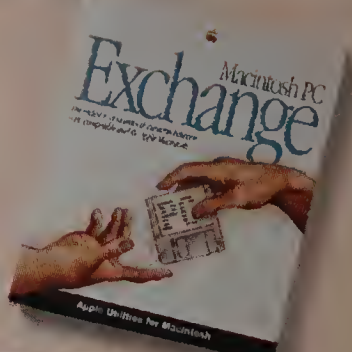
\$169

Macintosh PC Exchange

Open PC files on 3.5" MS-DOS and Windows-formatted floppy disks. Read DOS files on your Mac desktop. Open, save, rename, move, copy and delete documents just as if they were Mac files! Customize the program for even faster access. Requires Apple SuperDrive or compatible.

COM0126

Publisher: Apple Computer, Inc.



\$69

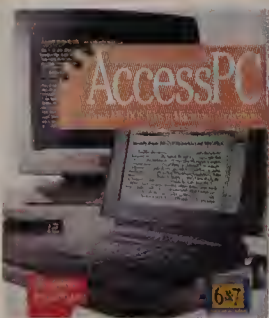
EXCITING NEW APPLICATIONS THAT TAKE FULL

AccessPC 2.0

With AccessPC 2.0, your Macintosh can make MS-DOS files look just like Mac files, instantly. Pop any DOS floppy in your drive, and in a couple of clicks, the PC files are on your Mac desktop, looking and acting perfectly Mac-like. Edit, copy, save, print, play with the numbers, print again, and give the PC people back their diskette. It's that easy to use any PC file in any Mac application.

AccessPC is an easy-to-install control panel utility that's always been completely compatible with System 6 & 7.

Publisher: Insignia Solutions
UTI0174



\$60

DiskFit Pro

Fast, efficient, easy backup. For Finder-readable backup to floppies, cartridge or other hard disks, get DiskFit Pro. DiskFit Pro copies files from a hard disk to a "SmartSet" of floppies, and then updates that "SmartSet" with each subsequent backup. By replacing only the obsolete files in the backup set, DiskFit Pro keeps your SmartSet from growing every time you back up. Backups stay fast and backup sets compact. And since files stay in Finder format, retrievals are a breeze. Don't leave your data at risk, backup with DiskFit Pro. System 7 Savvy, System 6.x compatible.
Publisher: Dantz Development
UTI0246



\$74



SAM 3.0 or NUM 2.0*

SAM 3.0 detects viruses by monitoring the suspicious activities that characterized them. Version 3.0 has enhanced update and repair capabilities, faster scanning, and more. The CDEV portion operates during normal Mac usage, and offers a number of options for checking disks and folders as you work. UTI0214 \$65

NUM 2.0 combines and integrates two outstanding collections of Mac utilities: SUM 2.0/NUM 1.1 plus automatic backup, data security (both DES and FastCrypt), and many productivity enhancements. Other utilities recover lost or accidentally deleted files, restore crashed hard disks and more. Publisher: Symantec
UTI0151

\$95*

Overnight Delivery Only \$3.00! Call 24hrs. - 7 days!

TO UPGRADE NOW!

System 7 brings dynamic new capabilities and ease of use to everyone who uses a Mac... System 7 builds on the Mac basics you already love, and paves the way for a whole generation of powerful new software. A simple click of the mouse installs the software. Then advanced features take over, letting you work faster, easier, and more productively.

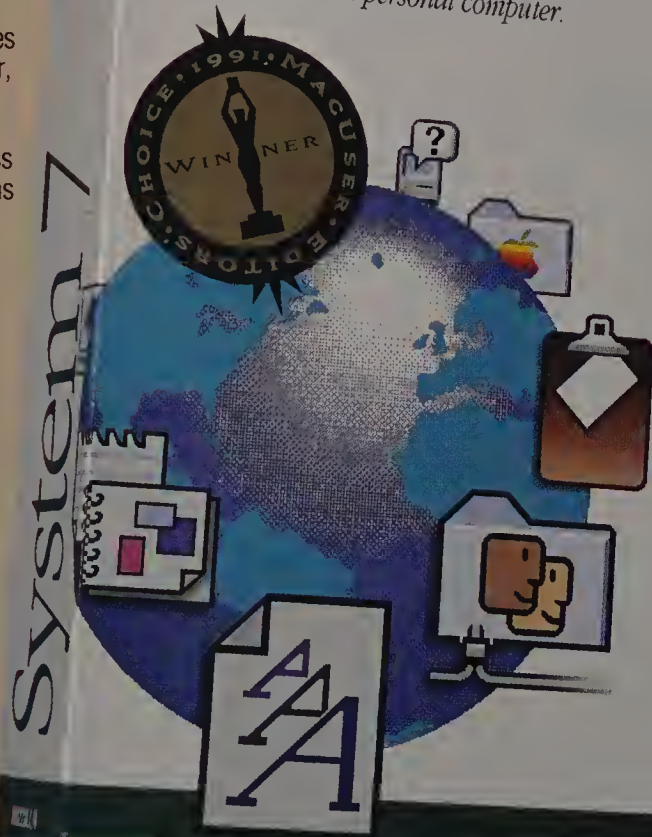
- Multitasking provides effortless switching between applications
- Finder 7 lets you customize your desktop to the way you work
- File Sharing allows access to any folder and its contents among workgroups
- Publish & Subscribe lets you update several documents by only changing one
- TrueType gives you crisp, clear type of any size

And that's just for starters! Now it's easier than ever to get System 7 up and running on your Mac, because you can get it right from MacWAREHOUSE! Join the generation of System 7 power users!

Order System 7 today!

System Software for the Apple® Macintosh®

System 7 brings a new world of power, ease of use, and versatility to every Macintosh personal computer.



System 7

\$79

**Limited Offer -- Not Available to Resellers.*

System 7 Personal Upgrade Kit
SYS0001
Publisher: Apple Computer, Inc.

System 7 Group Upgrade Kit
SYS0002 **\$279**
System requirements: 2MB RAM; hard disk drive.

Apple, the Apple logo, Mac and Macintosh are registered trademarks of Apple Computer, Inc. Apple is a registered trademark and QuickTime is a trademark of Apple Computer, Inc.

FREE! with your order!

Make System 7 even easier with this **Personal Training Systems System 7 Tutorial!**

Get up and running with System 7 in a flash! This Personal Training Systems Tutorial is the fastest, easiest way to put all the power of System 7 right to work on your Macintosh desktop. And it's yours FREE* with your order for any product from MacWAREHOUSE! Just ask for item #AAA0021 when you place your order.

*\$2.00 shipping and handling charge applies.

FREE* when you order System 7 from MacWAREHOUSE!

ATM with four FREE fonts!
Get the Adobe Type Manager program disk, user guide and registration card FREE* from MacWAREHOUSE when you order System 7. You'll also get as a bonus, four Adobe Garamond typefaces from the Adobe originals®. When you place your order for System 7 just ask for item #AAA0023.

*\$2.50 shipping and handling charge applies.

Personal Upgrade Kit

QuickTime Starter Kit

Play QuickTime movies right on your Mac! Pause, fast-forward, rewind, advance frame by frame. Copy video and animation clips and paste them together. Transform still images and information into a single movie. Use a video-capture card and sound digitizer to record movies with the touch of a button. QuickTime brings Multimedia to the Mac! **GRA0347** Publisher: Apple Computer, Inc. **\$169**

AppleTalk Remote Access

Gain direct access to information and resources from your AppleTalk network. Simple to set up and use. High performance is optimized for a broad range of modems. Provides multiple security levels, and requires only System 7 and a high-speed modem. No special hardware required. **COM0131** Publisher: Apple Computer, Inc. **\$175**

AppleShare 3.0

Connect up to 120 users using a variety of cabling choices. New version offers faster server start up, improved integrity and error handling, plus the ability to mount and unmount removable media while the server is running. **NET0250** Publisher: Apple Computer, Inc. **\$1059**

ADVANTAGE OF THE POWER OF SYSTEM 7!

UserLand Frontier

Frontier is the power user's scripting system for System 7. Write and run your own utilities to customize the Mac file system, networks and applications. Frontier has all the development tools you need to get your scripts running quickly, including a full script debugger and structured symbol tables you can watch and edit while your scripts are running. When your done, you can link scripts into Frontier's editable menu bar, or save them to the Finder desktop. Publisher: UserLand Software UT10272



\$189

AutoDoubler or DiskDoubler 3.7

AutoDoubler is the easiest way to increase hard disk capacity. It's lightning quick and completely transparent, so it won't interrupt your work. The new patent-pending technique lets your Macintosh use files and applications while they are still compressed! It's fully compatible with almost all applications, desk accessories, and system extensions. **UT10254** \$49.

DiskDoubler 3.7 gives you total control of file compression-archiving for modem transfer, compressed backups, self-expanding files, and fast copying of files. Combined they give you the ultimate in speed, convenience, and control. System 7 Savvy! Publisher: Salient **UT10179**



\$49 ea.

Word 5.0 or Excel 4.0

Microsoft Word 5.0 simplifies word processing, whether you need to dash off a quick memo or create a complex report. Its Ribbon control panel makes changes with a single mouse click. Includes a grammar checker, spelling checker and thesaurus. **WRD0050** \$295.



Publisher: Microsoft **BUS0223**
MICROSOFT EXCEL 4.0
UPGRADE ONLY \$99!

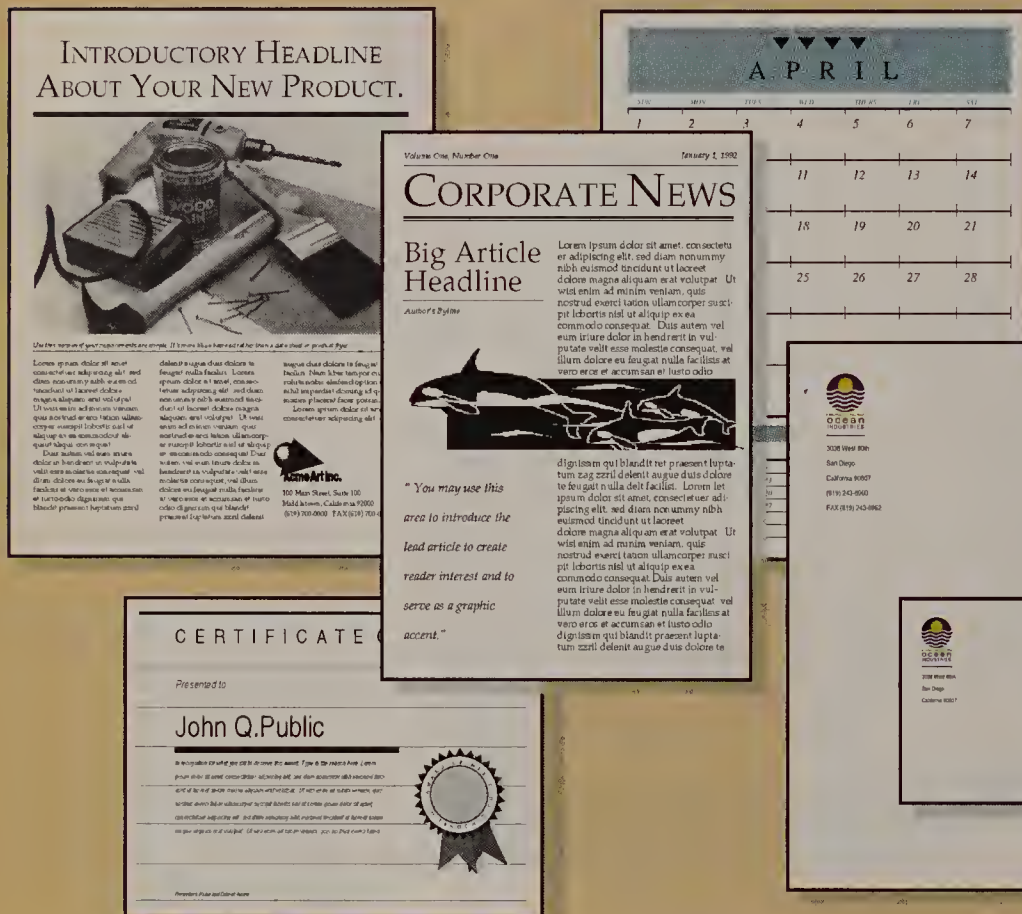
Microsoft Excel 4.0 streamlines the tasks of creating and using a basic spreadsheet. Fully System 7 Savvy, it now allows you to include QuickTime audio/video clips in your spreadsheets. Wizards (Excel's on-line assistants) walk you through complex tasks.

\$295 ea.

To order, call MacWarehouse at 1-800-255-6227.

Page layout that's easier
Aldus Personal Pre

You want all your documents to look polished and professional. You've seen how graphics and charts can jazz up those otherwise dull memos and reports. But trying to do page layout with your word processor is almost impossible. And high-end page layout programs take too much time and effort. Introducing Personal Press 2.0 — the first page layout software that does it all for you — automatically!



Personal Press 2.0 Main Features

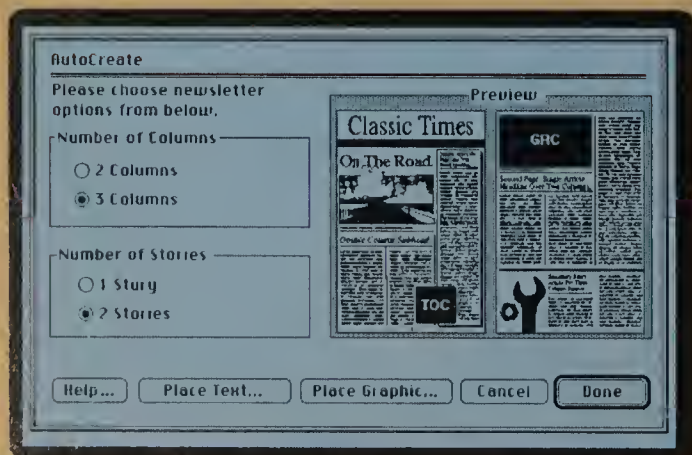
- “Intelligent” Templates help you create, assemble and print professional-quality documents with ease
 - Full Featured Word Processing with 100,000 word spelling checker, 660,000-synonym thesaurus, search and replace, and magnification of 10% - 400%
 - Interactive Graphic Previews show you what will happen before it happens
 - Aldus Additions make special tasks, such as creating drop-cap letters, pull quotes and bullet text, fast and automatic
 - Copy Fit automatically adjusts text to fit the space you designate
 - Text Wrap lets you easily wrap text around text and graphics of any shape
 - Free Rotation of text and graphics

“Intelligent” Templates guide you through the whole process.

Create a publication that's perfect for your needs in a matter of minutes with Personal Press. Choose from a wide selection of professionally-designed, "intelligent" templates for newsletters, forms, memos, flyers, brochures, greeting cards, and more. The templates take care of everything — headlines, tabs, indents, image cropping, text size and style, even table of contents. The templates also fine tune the document for you, so it's clean, professional, and ready to print. Plus, each template includes several variations, so you can create a custom look without spending a lot of time or effort.

*Personal Press does the work,
so you don't have to.*

Use the Copy Fit command and Personal Press will reformat your text to fit in the space you designate. AutoFlow eliminates the guesswork because it adds pages to your document as necessary. Interactive Graphic Previews show you what will happen before it happens, and provide constant, interactive feedback so you can avoid mistakes and work more efficiently. Text Wrap automatically wraps text around text and graphics of any size or shape. And with the incredible Aldus Additions, performing special tasks, such as creating drop-cap letters, pull quotes or bullet text, is fast and automatic.



*The AutoCreate
dialog box lets
you see how
your publication
looks as it's
being built.*

than word processing!

ss 2.0 — Only \$99

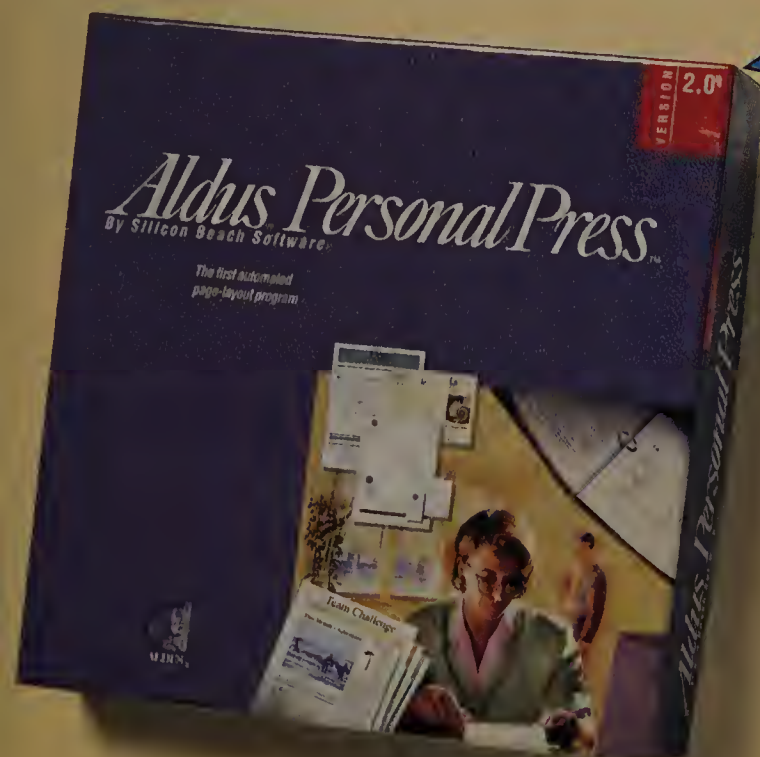
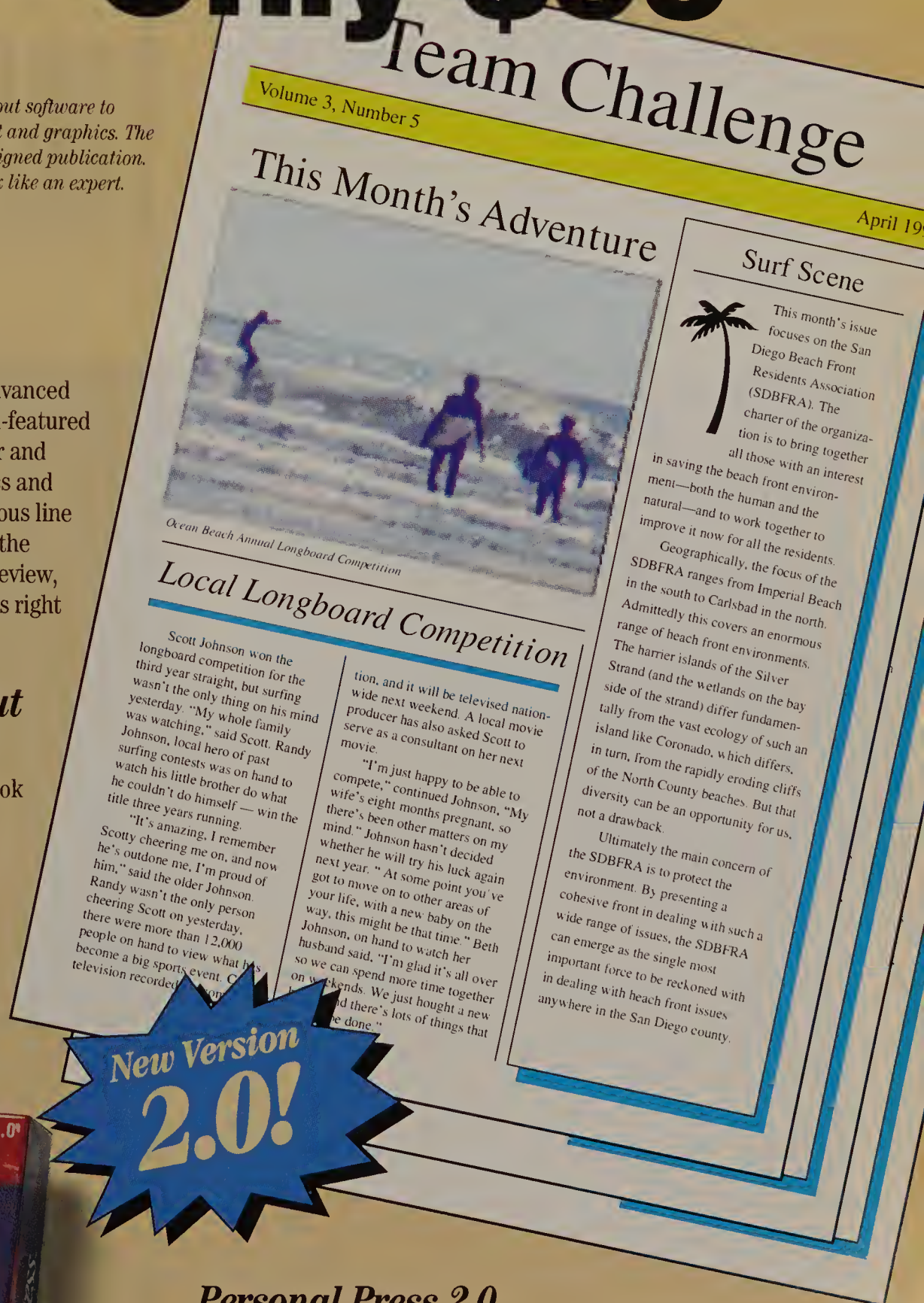
Aldus Personal Press 2.0 is the first page layout software to automatically design and assemble your text and graphics. The result is a quick-to-create, professionally-designed publication. Personal Press puts it all together so you look like an expert.

But if you'd really rather do it yourself...

Personal Press 2.0 gives you powerful tools and advanced features that are easy to learn and use. There's a full-featured word processor with a 100,000 word spelling checker and 660,000 synonym thesaurus. Import text and graphics and rotate them freely for just the right look. Create various line styles, including hairline and custom widths. Adjust the brightness and contrast of your grayscale images. Preview, crop, scale, and place frames from QuickTime movies right into your document. And much, much more.

Outstanding printing and output capabilities.

With Personal Press, your documents will really look great in print! Output to the most popular Mac printers, including high-resolution black and white and color QuickDraw and PostScript printers. Rotated text prints at the highest resolution possible, and your grayscale images will come out looking clean and crisp. Personal Press will even print spot color separations.



**Personal Press 2.0 —
Makes you look like an expert!**

DTP 0080 FaxFACTS 2502

Publisher: Aldus

Suggested Retail: \$199

System requirements: Mac Plus or higher (including PowerBook family and Quadra); System 6.0.3 or later (6.0.5 or later recommended); 1 MB RAM (2 MB recommended); hard disk drive.

Aldus and the Aldus logo are registered trademarks and Personal Press is a trademark of Aldus Corporation.

MacWAREHOUSE

1-800-255-6227

Overnight Delivery Only \$3.00!

Call 24 hours a day, 7 days a week.

©1992 Micro Warehouse Inc

MWK2S



The phone rings. You pick it up without stopping to think. A computer doesn't have that luxury. Its "brains"—the central processor—must calculate every step needed for any action. People learn to perform complex actions without identifying the steps involved. By contrast, computers must string together a simple vocabulary consisting of two "words"—*on* and *off*—to handle complex actions. It comes down to intelligence versus brute force.

An Ever Smaller World As it sits on the computer's logic board, a processor looks rather dull—a dark gray block with a bit of gold for the wiring and black for the label. But if you peer under that drab cover, you glimpse what looks like a city seen from an airplane window. Thin strips of wire (called traces)—made of aluminum and so incredibly fine that you'd have to stack up 60 traces from a Motorola 68040 processor to equal the thickness of this page—crisscross the chip, connecting all of its many tiny parts.

Zoom in a little closer, and the processor takes on distinct patterns, one area looking as empty as a city's warehouse district, another as crowded as its downtown. Zoom in even further and you can see the individual regions—the processor's "buildings" that handle computations.

By zooming in closer yet, you can see the transistors—the basic components that do the processor's actual work. The

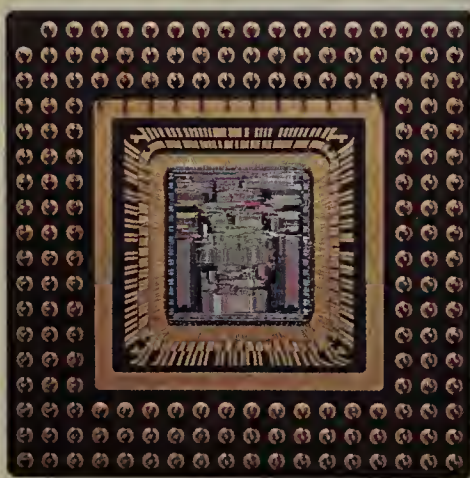
68000 processor, first introduced by Motorola in 1979 and still used today in the Macintosh Classic, has about 68,000 transistors (thus its name). The 68030 used in many Macintosh models has more than 300,000 transistors. There are more than 1.2 million transistors in the 68040 found in Apple's most powerful computers, the Quadras. And the next generation of processors may have tens of millions.

A World of Simple Choices Transistors do a very simple thing: turn on and off. Yet, they control everything that happens in the processor. It's as if stoplights controlled everything that goes on in a city.

A transistor either lets electricity flow (the *on* state) or prevents it from flowing (the *off* state). A series of transistors is called a *circuit*. Electricity flows through the circuit—the exact path that the electricity follows is determined by the on and off patterns formed by the transistors. The vast number of possible paths that electricity can take—each with its own meaning—coupled with the fast speed at which the transistor can move data along those paths lets the processor handle complex computations.

A transistor is made from silicon, which normally blocks electricity but can be forced to let electricity through (that's why silicon is called a *semiconductor*). In a transistor, an aluminum trace comes in at one side; a second trace comes out at the other. A strip of sili-

Inside the



A Motorola 68040 chip at the actual size.

SITE PHOTOGRAPHY BY STEVEN PUMPHREY / CHIP PHOTOGRAPHY BY ALEX VARNES / TRANSISTOR PHOTOGRAPH BY JIM ODUM, MOTOROLA



Engineers at Motorola discuss a pathway of the 68040 chip's mask, which is a road map of its circuitry.

by Lon Poole

FIRST

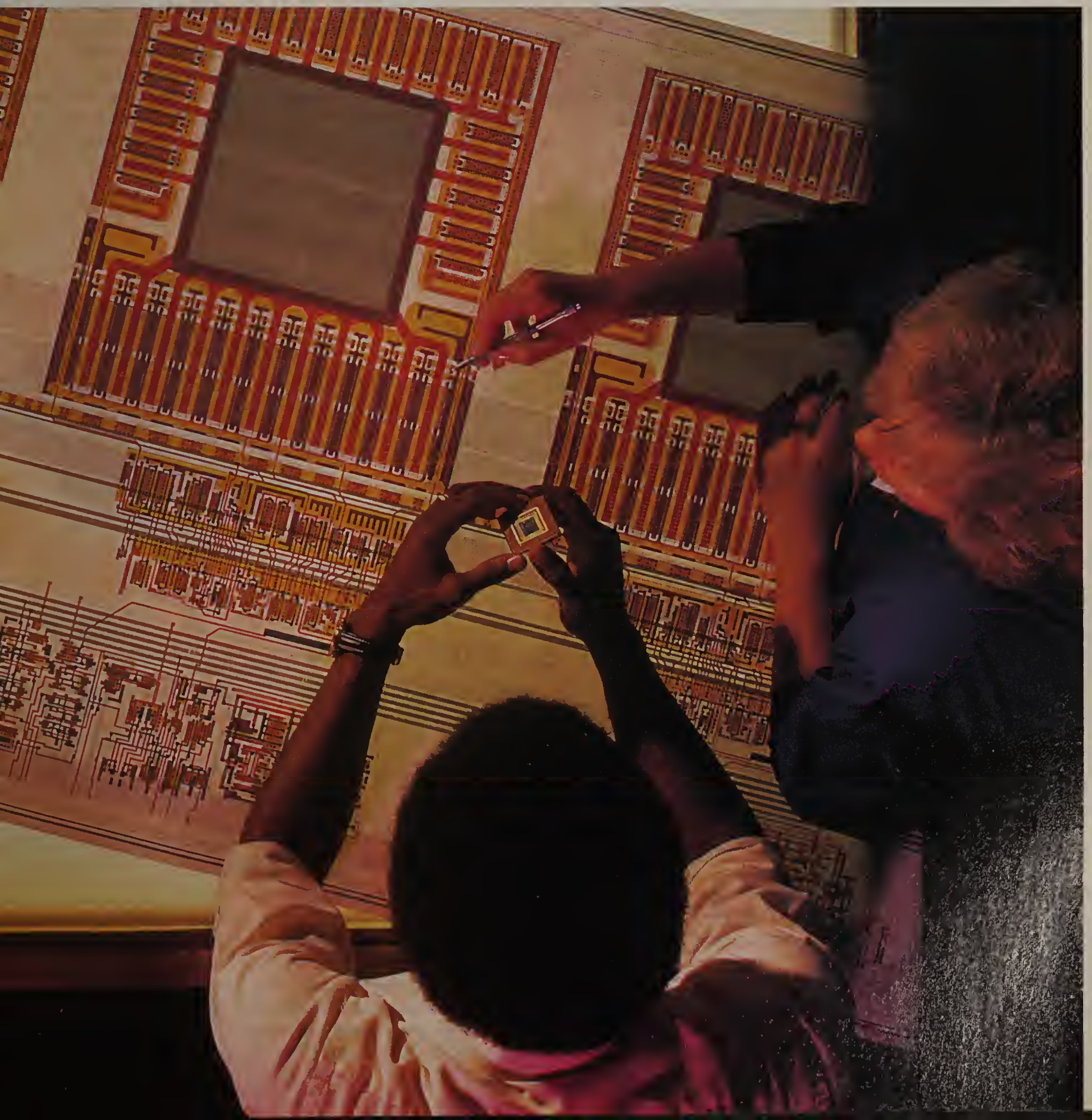
I N A

THREE-

P A R T

SERIES

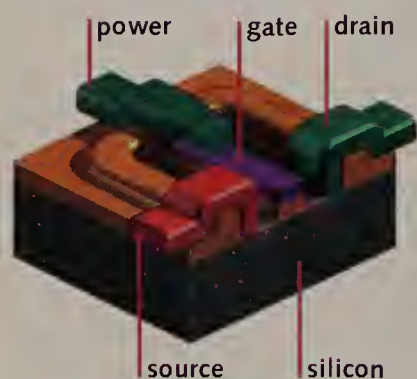
Processor



Making a Processor

Modern processors like the Motorola 68040 contain well over a million tiny transistors on a 1/2-inch square of silicon. Magnified slightly, it resembles a city viewed aerially, with transistors laid out by the thousands in neat districts, each district with a distinct function, and all connected by metal traces so thin that 70 side by side across would fit within the width of a single hair. Although their scale lets integrated circuits be complex, they consist of simple transistors that all work alike and can be fabricated en masse. Manufacturing a processor takes scores of meticulous steps, which are performed mostly by machine under human supervision. The incredibly intricate product of this effort, the processor, goes to work for you every time you turn on your computer.

HOW A TRANSISTOR WORKS



A transistor is an on/off switch. It conducts electricity when a separate electrical charge (red) on the gate (purple) attracts electrons to the silicon below it. Without the charge (green), the gate does not attract electrons to the silicon, so the transistor does not conduct.

PREPARING WAFERS



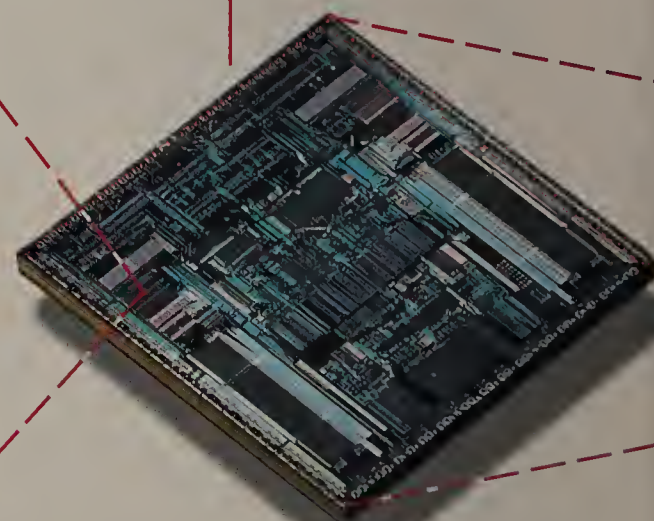
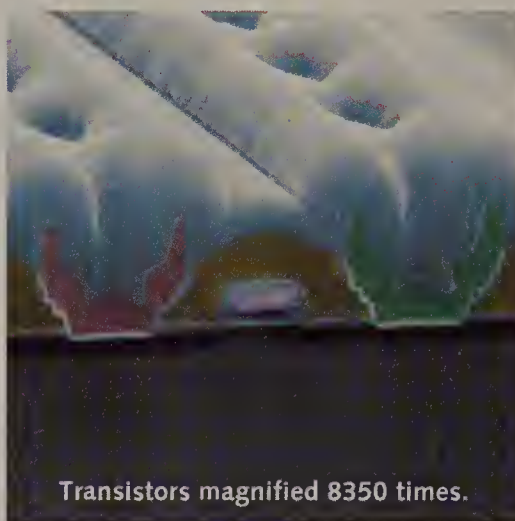
CREATING THE SILICON Silicon refined from quartz is grown at 1500°C into a 5-foot-long, cylindrical ingot 5 inches across. A diamond saw slices it into wafers that diamond abrasives grind credit card-thin (24 mils) and polish mirror-smooth.



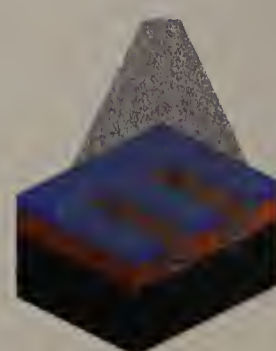
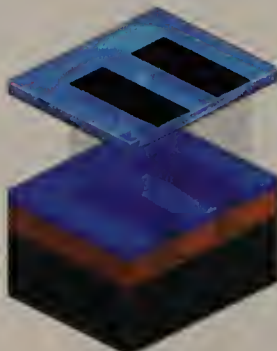
LAMINATING WAFERS In super-clean rooms (less than one sub-bacterial particle per cubic foot) workers operate machines that build transistor circuitry layer by layer on the wafer. A 5-inch-diameter wafer has dozens of 68040 circuits on it.



SLICING THE WAFER Spinning at 30,000 rpm, a diamond saw dices each wafer into individual processors, or *dies*. After clearing away the silicon sawdust, workers inspect each die through a microscope for defects and mark rejects with ink spots.



FABRICATING TRANSISTORS



LAYERING CIRCUITS Building each layer of a circuit takes several steps. Hot gases diffuse an insulating oxide film (the gold layer in the illustration) over the surface of the silicon wafer, or over subsequent layers. The wafer receives a coating of light-sensitive

plastic (blue layer) called photoresist, which is photographically imprinted through a stencil-like mask with part of the circuit diagram. The exposed photoresist hardens, and more hot gases etch away the unexposed photoresist and the oxide beneath it, reveal-

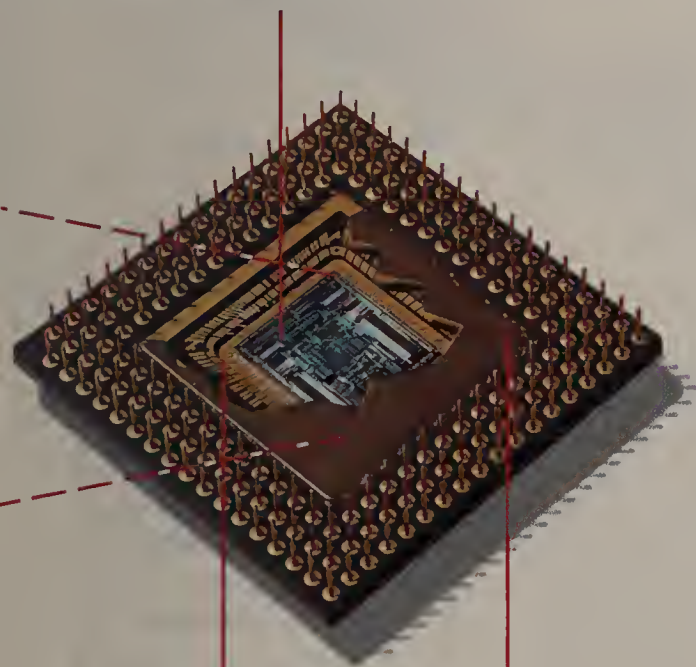
ing areas of silicon. A machine shoots ions (charged atoms) at the wafer, where they become implanted in the spaces between the molecules of revealed silicon (gray layer) and create a conducting region. This etching is repeated for each successive layer.



ASSEMBLING CHIPS



MOUNTING THE DIE A robot picks up each good die in turn and places it squarely on a drop of adhesive in a waiting ceramic or plastic carrier. The robot's vision system sees the ink spots that mark defective dies and the robot ignores the marked dies.



ADDING LEADS



STITCHING WIRES A robot weaves spider-web-thin (1-mil) wires between contact pads on the die and the pin-encrusted carrier. The impact of the weaving, together with a high-frequency vibration, bonds the wire leads to the pads.

APPLYING THE COVER



SEALING THE CHIP A robot clamps a solder-rimmed lid to the carrier and sends it through a 330°C furnace. The solder melts and hermetically seals the die inside the carrier. The final chip is then packaged for sale.

con called a *gate* sits between the two traces. Normally the gate keeps the electricity from jumping from one trace to the other—thus blocking the electricity's path. The gate is connected to a trace of its own; if that trace gives the gate an electric charge, the conductivity of the silicon changes and electricity flows from the incoming trace to the outgoing trace—thus turning on the transistor and letting the electricity continue down the path.

Turning Simplicity into Complexity The states of on and off represent the digits 1 and 0, and those two digits in turn can represent any kind of information—numbers, text, graphics, and more. Unlike the decimal number system, which has ten digits (0 through 9), the binary system has only two digits (0 and 1), so you need a longer string of binary digits than decimal digits to denote a value greater than one (see “Representing Data”). For example, the binary system doesn't have the digit 2; it denotes the value two with the two-digit combination 10.

Just as each additional digit in the decimal system stands for a higher power of ten ($10 = 10^1$, $100 = 10^2$, and so on), each additional digit in the binary system stands for a higher power of two ($10 = 2^1$, $100 = 2^2$, and so on). Each binary digit is a *bit*; eight bits make a *byte*.

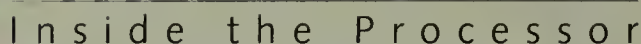
The more digits a processor can handle at one time, the faster it can work: raw processing power overcomes the binary system's inherent inefficiencies. That's why all Macs use 32-bit processors, not 16-bit processors. And by processing 32 bits at a time, the computer can handle more complex tasks than it can when processing 16 bits at a time. A 32-bit number can have a value between 0 and 4,294,967,295. Compare that to a 16-bit number's range of 0 to 65,535, and you see why calculations that involve lots of data—everything from tabulating a national census count to displaying the millions of color pixels in a photo-realistic image on a large screen—need 32-bit processors.

Digits inherently denote numbers, not text. So how does a processor handle nonnumeric data like letters, punctuation, and other symbols? By encoding the data as numbers. The most common encoding scheme for English, called ASCII (American Standard Code for Information Interchange), encodes *A* through *Z* and *a* through *z*, the numerals 0 through 9, and common symbols and punctuation marks with numbers between 0 and 127. Accented letters are not part of the ASCII code, but they and other symbols are often encoded with numbers between 128 and 255.

Numbers can also specify graphics. In the simplest case—a picture composed of black and white dots—a 1 represents a black dot and a 0 represents a white dot. More colors or shades of gray require more bits per dot—2 bits for 4 colors or grays, 4 bits for 16 colors or grays, 8 bits for 256 colors or grays, 16 bits for 32,767 colors, and 24 bits for the 16.8 million colors in a photo-realistic image.

Instead of dots, graphics can be composed of shapes or objects such as lines, curves, rectangles, and ovals. Each object in a picture is specified by a list of binary numbers. For example, four numbers specify a line—the horizontal and vertical coordinates for each of its two endpoints.

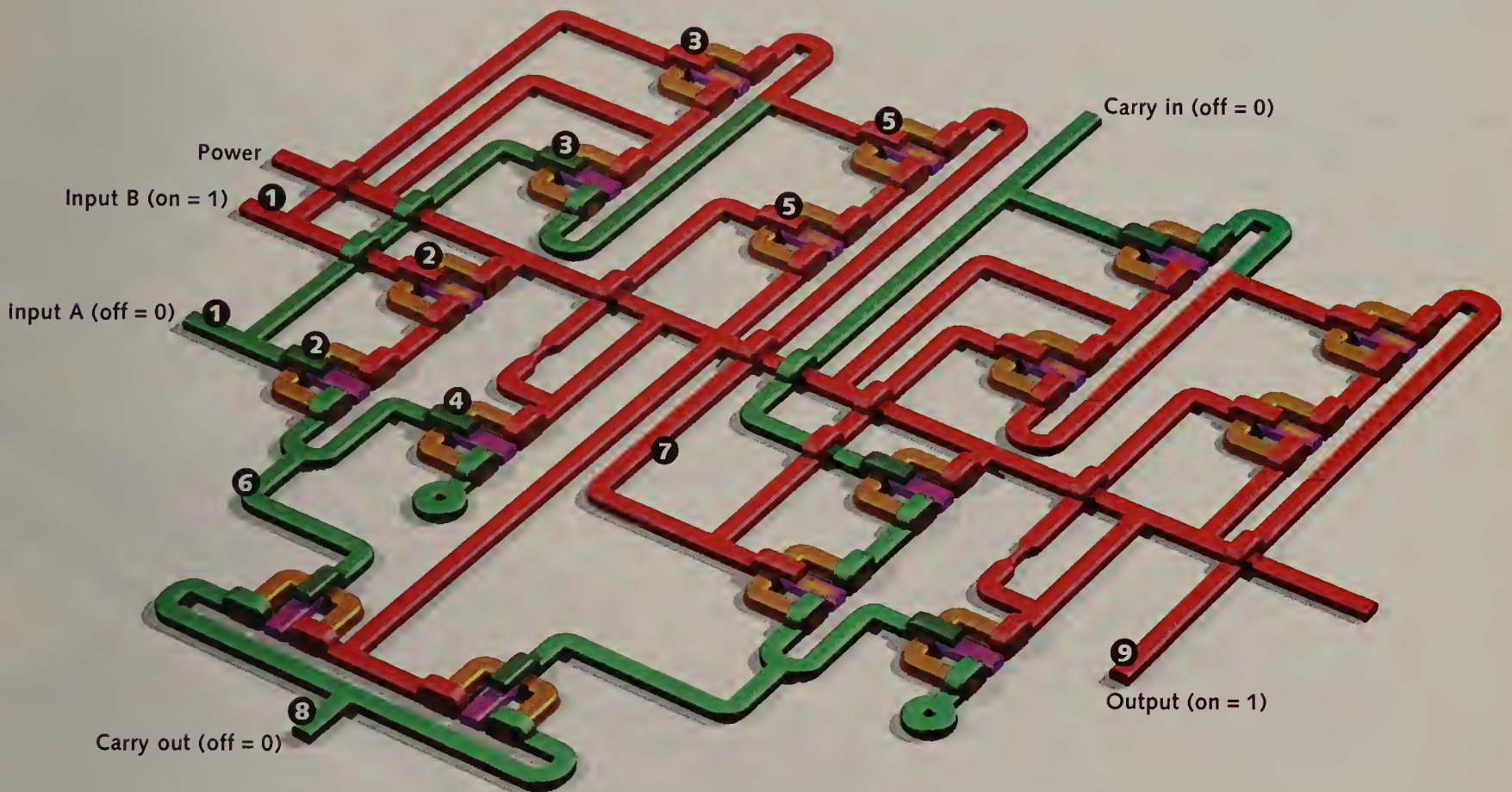
Thinking Digitally In combination with other simple electronic parts in the processor, transistors can process digital information—move it, compare it, add it, subtract it, and more. The key is having enough transistors in the circuit to do the job. For example, it takes a circuit with 16 transistors and 2 resistors (which help direct



To make the computer a tool for word processing, drawing graphics, creating and evaluating spreadsheets, or playing a game, a person must create a program by arranging instructions in the appropriate sequence. Each task must be spelled out in fine detail. Imagine having to consciously control every muscle movement needed to write

140 October 1992 **MACWORLD**

HOW A PROCESSOR ADDS BINARY DIGITS



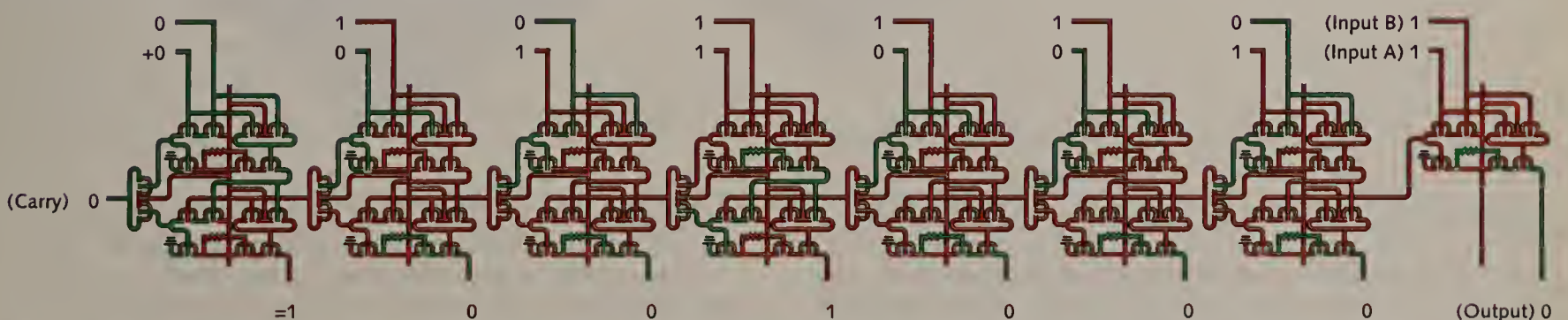
A circuit combining 16 transistors and 2 resistors (which resist electrical flow) can add two binary digits according to four simple logic rules.

The digits themselves are added as follows: (1) The two digits to be added are input as on or off signals to two pairs of transistors. Each pair of transistors combines the inputs and produces an output according to the logic rules. Here, input A is 0, or off, and input B is 1, or on. (2) The first pair of transistors outputs 1 only if both input A and input B are 1; otherwise it outputs 0. Here, input A is 0 and input B is 1, so the output is 0. (3) The second pair of transistors does the reverse of the first pair: it outputs 1 if either input A or input B is 1; otherwise it outputs 0. Here input A is 0 and input B is 1, so the output is 1. (4) The output of the first pair of transistors is inverted by the combination of a transistor and a resistor. Here, a 0 is inverted to a 1. (5) The inverted output of the first pair of transistors and the output of

the second pair become the inputs for a third pair. This third pair combines its inputs according to the same rules as the first pair: the output is 1 only if both inputs are 1 (here, they are). The output of the third pair is the sum of the original two inputs. (6) The carry digit, if any, from adding the original inputs is the output of the first pair of transistors (in this case, there is no carry).

(7) The result of the addition is then moved to a second set of transistors in the addition circuit, which adds the result to a carry digit from a previous circuit's calculation. The second set works the same way as the first set (see steps 2 through 5). Here, the carry digit is 0 (which means there was no carry from the previous calculation). (8) The carries from both sets of circuits are merged and sent on to the next addition circuit. Here, neither set results in a carry, so the carry output is 0. If either or both carries were 1, a 1 would be passed on. (9) Thus, the output of the bit adder is the sum of three digits: inputs A and B (added in the first set of transistors) and the carry input.

ADDING BYTES TOGETHER

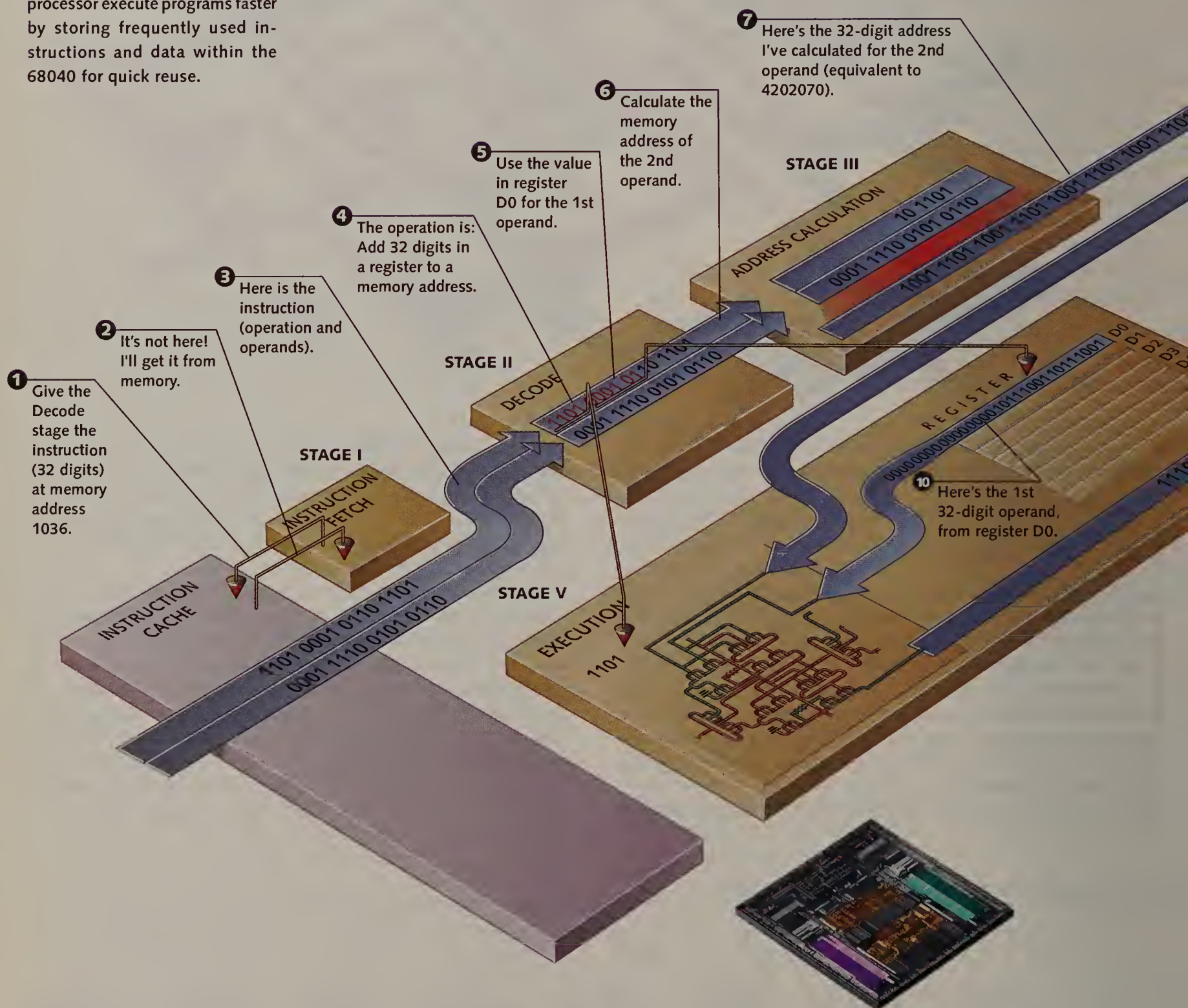


Several one-digit adders can be linked to add multiple digits. One adder handles the rightmost digits from each number, another adder handles the digits second from the right, and so on. The output of each one-digit adder is the sum of three digits: the two input digits and the carry

from adding the two previous digits. The carry output of each one-digit adder feeds into the carry input of the next one-digit adder to the left (the first adder has no carry coming in, and needs no transistor to handle one). To add two bytes requires eight adders, one for each set of bits.

Tracing a Calculation

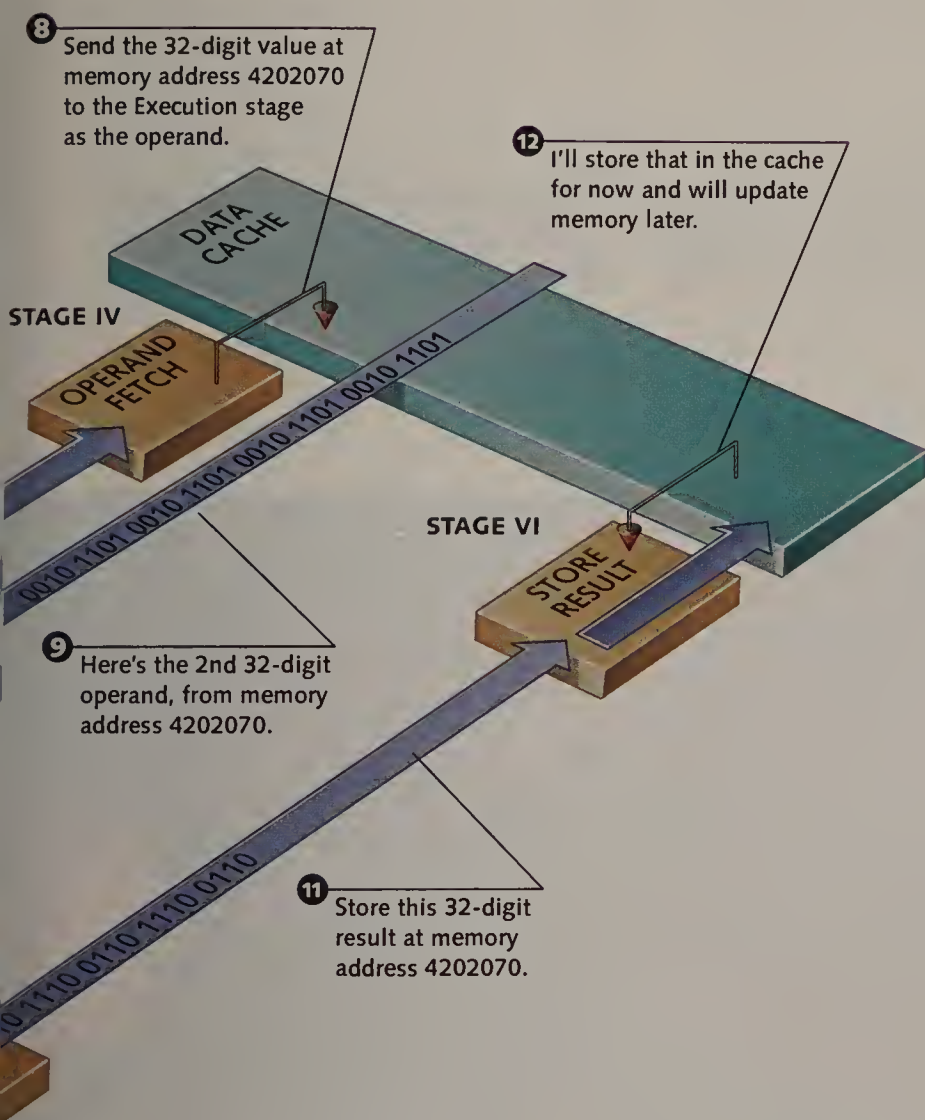
Discrete regions of the processor have specialized jobs. The Motorola 68040's integer unit, for example, does arithmetic and manipulates data in other ways by executing a program of instructions stored in the computer's memory. The instruction cache and data cache help the processor execute programs faster by storing frequently used instructions and data within the 68040 for quick reuse.



EXECUTING AN INSTRUCTION

The 68040's integer unit executes instructions piecemeal in a six-stage pipeline. An instruction enters the pipeline at the *instruction fetch* stage and progresses sequentially. As soon as stage one finishes an instruction, the processor passes the result to stage two, and stage one can begin the next instruction. At any instant, the integer unit could be executing up to six instructions in parallel.

Here you see what each stage of the pipeline does with an instruction that adds the value in a *register* (a scratch-pad portion of memory inside the integer unit) to the contents of a memory address. Typical programs contain thousands of instructions, many executed repeatedly in loops. A fast microprocessor like the 68040 can execute more than 20 million instructions per second.



INTEGER UNIT'S PIPELINE STAGES

STAGE I: INSTRUCTION FETCH Gets the instruction from the instruction cache (or main memory) and sends the instruction to the Decode stage.

STAGE II: DECODE Separates the instruction into an **operation** and **operands** (the data the operation acts on or that data's location).

STAGE III: ADDRESS CALCULATION Calculates addresses for operands located in memory.

STAGE IV: OPERAND FETCH Gets the value of an operand from the data cache (or memory address).

STAGE V: EXECUTION Initiates the operation designated by the instruction. The operation code selects the circuitry to perform the operation (in this case, addition). If the result goes to a memory address, the Execution stage sends the address and the result to the Store Result stage. If the result goes to a register, the Execution stage puts the result in the register.

STAGE VI: STORE RESULT Sends results from the Execution stage to the data cache, which in turn updates the relevant memory address.

your name—that's what a processor must do for every task.

The processor executes instructions in series (see "Executing an Instruction"). Each instruction is a binary number, and the processor must decode the number to identify the type of operation to perform, where to find the binary data on which to perform the operation, and where to put the result.

Eventually the processor encounters an instruction that tells it to branch to an instruction out of sequence and to continue from there. A branch can be conditional, perhaps happening only until a register or memory location contains a certain value—for example, a dialog box stays displayed until a user clicks Cancel or OK. Often a branch instruction returns to an instruction earlier in the program, creating a program *loop*. Programs commonly loop until an event such as a key press or a mouse-click occurs.

Improving Processor Speed To make loops run faster, some processors—the 68020, 68030, and 68040—have their own memory, called an *instruction cache*, for storing recently executed instructions. Often, an entire loop fits in the instruction cache, and the processor can repeat the loop any number of times without slowing down to repeatedly get instructions from the computer's memory. The 68030 and 68040 also have caches for data.

Processor speed is usually stated in millions of *clock cycles* per second, or megahertz (MHz). No instruction can take less than one clock cycle (if the processor completes the instruction before the cycle is over, the processor must wait). Common processors operate at speeds from 8MHz to 50MHz. At 8MHz, each clock cycle lasts 0.125 millionths of a second; at 50MHz, 0.02 millionths of a second.

But raw speed is not enough to squeeze the most performance out of a processor. Smart design augments the newest processors' brute force.

Some processors contain a group of circuits that can work on several instructions at the same time—just like a factory that has several assembly lines running simultaneously. The more instructions a processor can work on at once, the faster it runs. The Motorola 68040, for example, can work on six instructions at once. The 68030 is limited to four. That's why a 25MHz 68040 is faster than a 25MHz 68030.

Efficiency also counts. The fewer clock cycles per instruction, the better. For example, the Motorola 68020 takes 6 clock cycles to move data from a register to the logic board's main memory, while the 68040 takes just 1 clock cycle. The 68040, one of the fastest of today's processors, executes instructions at an average rate of 1.25 clock cycles each. The next generation of processors promises to do even better—achieving an average of one instruction per cycle.

Working for You The next time you turn on your computer, think about the tens of thousands (perhaps millions) of transistors switching on and off slavishly millions of times every second. Think about the processor shuffling bits of binary numbers that may represent any kind of information along incredibly thin metal traces. It's enough to make you wonder what's going on inside your own head—but that's another story. **m**

Contributing editor LON POOLE wrote *Macworld Guide to System 7* (IDG Books Worldwide, 1991) and *Amazing Mac Facts* (Microsoft Press, 1991).

Informational graphics by ARNE HURTY

CD ROM DRIVES

MACWORLD LAB TESTS 16 DRIVES

AND TELLS YOU HOW TO PICK AMONG THE BUNCH

Into the Mainstream



NEC Technologies' InterSect CDR-74 (top) and Mirror Technologies' CD-ROM Drive

BY THE TIME YOU READ THIS, there will be hundreds of titles—from multimedia encyclopedias to animated children's books—available on CD ROM discs. QuickTime movies, using Apple's new system extension that enables the computer to play back digital video in a small window on the screen, will also be widely disseminated on CD ROM. So be forewarned: if you don't have a CD ROM drive, you'll be left out of one of the most dynamic areas of Macintosh software development. Meanwhile, drive prices aren't likely to fall much more than they already have; in March, even Apple introduced a new drive, the CD150, that cost \$200 less than its predecessor, the AppleCD SC Plus. Seven of the drives we examined retail for less than \$600.

GEOFFREY NELSON



But before buying, consider that CD ROM drives are specialists; they read information from CD ROM discs but don't work as storage devices. And even the fastest CD ROM drives are slow. Fast hard drives have access speeds of about 16 milliseconds (ms); the fastest CD ROM drive tested for this article, the NEC InterSect CDR-74, has an average access time of 280ms, while the slowest, Optical Access International's Performer CD ROM and the Panasonic LK-MC501S, have an average access time of 500ms. But regardless of the drive, expect plenty of long delays while it reads data.

CD ROM versus CD Audio

IF YOU HAVE RECENTLY BOUGHT A DECENT audio CD player for about \$150, paying four times that price for a CD ROM drive that seems similar (but has fewer LCD readouts and fewer fancy buttons on the front) can be a shocking surprise. How come CD ROM drives cost so much more than their audio cousins? The CD ROM drive market is much smaller than the home-audio market, so there is no economy of scale to keep prices low. CD ROM players also have higher-quality components and need to be much more accurate than CD audio players do (see "Why CD ROMs Cost More than CD Audio Players"). And because an audio player has no SCSI interface, you can't hook one up to a computer; even if you could attach it, there are no electronics in an audio player to decode data on a CD ROM disc.

Evaluating Drive Performance

DRIVE PERFORMANCE IS MEASURED BY two numbers. Access speed, measured in milliseconds, is the average time it takes a drive to locate a random piece of information; transfer rate, measured in kilobytes per second (KBps), is the time it takes a drive to transfer information to the CPU (central processing unit).

Access time is the critical performance measurement when you are repeatedly searching a large database and pulling out small amounts of information, such as that on the text-only CDs. In an application like an encyclopedia, dictionary, or database, the drive spends most of its time looking for information on the disc; once it gets there, the drive can transfer that information rapidly.

Transfer rate matters most to people using multimedia titles. In those applications, finding data is secondary to transferring it rapidly and smoothly to the CPU for display. Once a 24-bit image or QuickTime movie is located, a large amount of data, sometimes many megabytes in size, must be transferred quickly

to the CPU. But CDs offer a narrow pipeline for transmitting large data files. At 150 KBps, the standard transfer rate for CD audio files, it should take a little over a minute to transfer a 10MB file. Add overhead from CPU processing, and the actual data-transfer rate for most drives is nearly 90 KBps, so that the same file actually takes closer to two minutes to transfer.

The NEC InterSect CDR-74 doubles the data-transfer rate to 300 KBps for data and drops back to 150 KBps for audio. (Without the drop in speed, music would sound like a 33-rpm record played back at 78 rpm.) The InterSect CDR-74 is a great multimedia playback machine, with the smoothest video of any drive tested. The rest of the drives had transfer rates between 150 KBps and 153.6 KBps, but even so, there were subtle differences in how smoothly big data files played back in our tests, largely due to how evenly the data was transferred to the CPU. Drives with the Sony and Hitachi mechanisms all had smoother video performance than did the slightly faster drives with Toshiba mechanisms.

Nearly all the drives we reviewed have a 64K buffer, or internal storage area (exceptions are the Performer CD ROM and the Panasonic LK-MC501S, which have 32K buffers); this buffer smooths out fluctuations in a drive's data-transfer rate. The better the buffering scheme, the more smoothly data flows to the CPU; the drive feels faster because there are no noticeable gaps or pauses while running applications.

But access times and transfer rates are both measured in ideal settings that have little to do with how well a drive actually performs in the real world. The average access times (listed in our features table) are useful for comparing one drive to another, but we did a series of three tests to measure how well the drives perform with applications and titles you're likely to use, and two tests designed by Apple to show how well drives can play back QuickTime movies (see "CD ROM Speed Tests").

Although our video-performance test confirmed that the NEC InterSect CDR-74's data-transfer rate was twice that of the other drives we tested, that innovation didn't translate into doubled performance in any of the real-world tests. Although the InterSect CDR-74 was one of the drives at the front of the pack, it was the fastest performer in only the graphics retrieval test, where large graphics files were loaded into Adobe Photoshop. In the other two real-world tests, the InterSect CDR-74's performance was comparable to that of drives using the speedy Toshiba mechanism; these include the CD Tech-

nology Porta-Drive, the Mirror Technologies CD-ROM Drive, the MacProducts Magic CD-ROM, and the Relax Technology Vista CD-ROM drives. The four tested drives with the Sony mechanism (from Apple, DynaTek, Liberty Systems, and PLI) and the Hitachi Home Electronics CDR-1750S came in around the middle of the pack.

But the access speed and data-transfer rates of a given mechanism don't tell the whole story on performance. The driver software, which mediates between the drive and the CPU, has an effect on performance, too. Of the 16 CD ROM drives we tested, 9 ship with various versions of the same driver (from Trantor). Three drives ship with drivers based on Optical Media International's (OMI's) CD-ROM Driver. Only Apple, Procom, and Optical Access International ship with proprietary drivers.

For text-based and graphics-based applications like dictionaries, multimedia encyclopedias, and other reference titles, all of the drives are adequate for occasional use. Even the slowest drives, the Optical Access International Performer CD ROM and the Panasonic LK-MC501S, could pull up a word definition fast enough to keep my attention from wandering, although it took nearly 20 seconds longer to complete the text-search test on the slowest drive than it did on the fastest drive.

For running QuickTime movies, accessing photo databases, or playing interactive games, a faster drive makes a significant difference. The rule of thumb is that for QuickTime movies, you need a drive that has at least a 400ms access time. With the exception of the Optical Access International Performer CD ROM, the NEC InterSect CDR-37, and the Panasonic LK-MC501S, all the drives were faster than that. Because of software caching, the NEC drive had adequate video performance. On the two slowest drives, movies play back with long pauses between frames and with noticeable audio gaps. With a faster drive, photos load more quickly, and movies play without too many noticeable pauses or stutters; you

become engrossed in the story and forget about the player that makes it happen.

QuickTime movies are decompressed by the CPU as they are transferred from the CD ROM, and this requires processing time. QuickTime keeps track of how long it takes to decompress and display each frame of a movie, and skips frames if necessary to keep the movie synchronized. This behind-the-scenes monitoring means that the faster the storage device and CPU work together, the more smoothly the movie appears to play back. We tested all the drives on a Mac IIci as well as an LC II to gauge relative digital video performance. On the LC II, even the fastest drive produced slightly jerky movies; some frames froze for an instant as more of the movie loaded into RAM.

QuickTime is still in its infancy, and

as better decompression software is written and distributed, movies will play back more and more smoothly on slower Macs. For now, the NEC Intersect CDR-74, the Sony- and Toshiba-based drives, and the Hitachi CDR-1750S all offer adequate video performance, with the NEC being the smoothest performer.

Picking the Right Drive

SPEED IS CERTAINLY THE MOST important criterion in choosing a CD ROM drive, but it's not the only one. Reliability, ease of setup, audio support, aesthetics, bundled software, price, and technical support also matter when you're shopping for the long term.

Dust can be a problem for CD ROM drives. If it gets inside, it interferes with the optical mechanism's ability to read the

laser beam that is reflected from the CD ROM's surface, causing errors. All the drives we looked at have automatic self-cleaning mechanisms that brush the internal lens of the optical mechanism. The NEC Intersect CDR-74, the Hitachi CDR-1750S, the Todd Enterprises TCDR-7050, and the Toshiba mechanism drives also have a second door that stays closed after you insert a disc, further sealing the inside of the player from dust. Although this requires an extra step for you when inserting a disc, it provides added protection from dust.

Listening to Audio CDs

IF YOU ARE SECRETLY PLOTTING TO buy a drive so that you can listen to Mozart while crunching numbers, you're in good company. CD ROM drives are basically CD audio drives with additional features, so they can be used to play music if you have software to play the audio files from the disc and you have a pair of headphones or amplified speakers. All the drives but the Sony (which comes with no software at all) come with audio software for listening in.

But headphones aren't your only option. All the reviewed drives except the MacProducts Magic CD-ROM, the Relax Vista CD-ROM, Texel America's DM5021 CD-ROM, and Todd Enterprises' TCDR-7050 offer preamp output jacks in the back of the players so that you can set up amplified desktop speakers or connect to a stereo amplifier. All the output jacks have separate right- and left-channel output RCA jacks except the DynaTek CDS 650, which offers mono-channel output only. If you buy NEC Gallery, or Procom MacCD Station packages, you receive a pair of desktop speakers, complete with batteries.

And if you're going to blast your music, you need a drive that can produce loud sound when you've got the volume pumped up: the Apple CD150, the Liberty 115 CD-ROM, the NEC Intersect CDR 37 and Intersect CDR-74, the PLI CD-ROM, and the Texel DM5021 CD-ROM all offered better-than-average volume levels in our tests.

Aesthetics

I PREFER DRIVES THAT HAVE AN indicator light on the front that shows whether the drive is on or off. The Apple, CD Technology, DynaTek, Hitachi, Liberty, MacProducts, NEC, Optical Access, Panasonic, Relax, and Todd Enterprises drives all have a power-on light.

The NEC Intersect CDR-74 and the Hitachi are the only drives that have the on/off switch conveniently located on the front of the drive.

Kodak's Photo CD

The big news in CD ROMs during the next 12 months should be the debut of the Kodak Photo CD. As this article goes to press, Kodak plans to bring its innovative new system to consumers by the summer of 1992. Consumers will be able to bring in rolls of 35mm film to participating photofinishers and get their photos back as high-resolution, color-corrected scans on a Photo CD for about \$20 for 24 images.

The scanners used for this process will be of extremely high quality, so at less than \$1 per image, the Kodak process could take a serious bite out of the desktop slide-scanner market as some consumers transfer their scanning tasks from the desktop to a Kodak outlet. Each Photo CD holds up to 100 images, so you'll be able to bring in multiple rolls of film and keep adding images until the CD is full.

In order to be considered fully Photo CD-compatible, CD ROM drives must understand the data format Photo CD uses and be able to read data that has been written in multiple sessions as each new roll of film is added to disc. Companies whose drives meet both of these criteria will be able to license a Photo CD logo from Kodak for their drives, to help consumers identify which products will work with the system.

At press time, there were no Photo CD-certified drives, although Apple, Philips, Sony, Pioneer, and Toshiba have all announced new drives that will be fully Photo CD-compatible and available in late 1992. These drives will be known as multisession drives.

Today, only the Sony-based drives can read a Photo CD, and they can only read the first set of images written to it. This is known as single-session capability (see "CD ROM Drive Features"). If you bring your Photo CD back to a photofinisher and add another set of images to your CD, even your current Sony-based CD drive will not be able to read the new information; when you mount the CD on your desktop it will still look as if there is just one set of images on the disc. This happens because the drive's internal instructions (its firmware) haven't been updated yet to recognize data that is recorded in more than one session to a CD (until Photo CD came out, no CDs were written in this way). Still, if you're in a hurry to use Photo CD right away and you already own a Sony-based drive, or you don't need to fill up each Photo CD by adding new images to it, single-session capability might serve your needs.

Reading a Photo CD is one thing, but accessing the images in applications requires special software because Kodak writes images to Photo CD in a proprietary compressed-image format called PhotoYCC color encoding, which requires translation into standard Macintosh formats. Apple has announced that the next version of its QuickTime system software (which should be available by the end of the year) will provide direct access to Photo CD images for any application that currently supports PICT. Kodak is also selling Photo CD Access, an application for previewing and retrieving images, and the Kodak Photo CD Access Developer Toolkit, a tool for developers who want to build direct Photo CD support into their applications.

Why CD ROM Drives Cost More than CD Audio Players

CD ROM drives cost more than CD audio players because CD ROM drives are designed with more expensive, and more rugged, components.

A CD ROM drive contains extra electronics that double and triple check the data that the drive reads from the disc. The human ear cannot detect individual missed bits of data in a piece of music, but the same amount of erroneous information can crash a computer program in milliseconds.

The motor that spins the compact disc is located directly below the spindle. Spindle motors for CD ROM drives must be more durable and reliable than those used in most audio players. To search for random data a CD ROM drive must increase and decrease speed constantly, while an audio CD usually plays only from beginning to end.

CD ROM drives have SCSI interfaces and data buffers not used in audio drives.

In a CD ROM drive, a caddy protects the disc from mishandling; this requires an additional loading mechanism that audio drives don't need.

The actuator, which moves the optical head assembly across the disc, must be able to survive many more back-and-forth seeks on a CD ROM drive than on an audio CD drive.



CD ROM Speed Tests

Color Key

Fastest

Percent slower than fastest

Up to 10%

11%–20%

21%–29%

30% or more

* The Panasonic and the Sony drives were tested with Trantor's driver software.

** In June, OAI shipped version 1.5 of the Access Allegro driver; spot tests showed that the Allegro drive now runs at speeds comparable to those of the other Toshiba-based drives.

Overall Fastest	1.00	NEC InterSect CDR-74 (NEC)
	0.82	Relax Vista CD-ROM (Toshiba)
	0.82	Mirror CD-ROM Drive (Toshiba)
	0.82	CD Technology Porta-Drive (Toshiba)
	0.82	MacProducts Magic CD-ROM (Toshiba)
	0.78	DynaTek CDS 650 (Sony)
	0.78	PLI CD-ROM (Sony)
	0.78	Liberty 115 CD-ROM (Sony)
	0.77	Sony CDU7211W* (Sony)
	0.77	Apple CD150 (Sony)
	0.77	Hitachi CDR-1750S (Hitachi 1750)
	0.76	Texel DM5021 CD-ROM (ShinaKen)
	0.75	OAI CD Allegro CD ROM** (Toshiba)
	0.73	NEC InterSect CDR-37 (NEC)
	0.63	Panasonic LK-MC501S* (Matsushita)
Overall Slowest	0.49	OAI Performer CD ROM (Matsushita)

Text Retrieval (in seconds)	Graphics Retrieval (in seconds)	Mixed Retrieval (in seconds)	QuickTime Video (in Kbps)	Data (in Kbps)
32.8	8.3	67.2	178.0	299.7
32.1	12.2	64.4	160.0	149.0
31.9	12.3	65.2	160.0	149.0
31.9	12.3	65.3	160.0	149.0
32.3	12.4	65.2	160.3	149.0
37.0	12.3	70.0	157.0	149.0
37.2	12.4	69.2	157.7	149.0
36.9	12.5	69.9	157.0	149.0
38.9	12.4	70.1	157.0	149.0
35.7	12.4	68.3	141.0	149.0
37.4	12.6	66.5	140.7	149.0
39.0	12.6	75.9	161.0	149.7
32.0	12.3	67.5	135.0	100.0
40.8	12.6	75.2	144.0	149.0
51.1	22.4	78.8	138.0	150.0
51.3	21.6	78.1	44.0	100.0

The drives are listed from best overall performance (top) to worst overall performance (bottom), based on both application and low-level QuickTime playability tests. The manufac-

turer of the mechanism the drive uses is listed in parentheses.

For application tests, we measured each drive's ability to find and retrieve specified text from a

reference work, find and retrieve images from an image database, and load screens containing text and graphics from a multimedia presentation.

The Panasonic LK-MC501S and the Optical Access International Performer CD ROM—both based on the slow Matsushita CD ROM mechanism—require an annoying manual ejection after the drive is unmounted on the desktop.

Bundled Software

APPLE, MACPRODUCTS, MIRROR TECHNOLOGIES, Optical Access International, PLI, and Relax all ship demonstration CD ROM discs with their drives. Only the Apple CD-ROM Titles Sampler and the Introduction to Nautilus offer much in the way of entertainment. The Apple Titles Sampler lists over 200 titles available on CD and includes demos of most of the titles, as well as pricing and contact information. The Nautilus disc is a compilation of the kind of multimedia information and software that comes with a subscription to the Nautilus service—13 disks yearly for \$18 (U.S. residents) or \$30 (international residents). The other dem-

onstration discs are less enticing HyperCard stacks.

The choice for best CD bundle is among NEC's Gallery, Procom's MacCD Station, and Mirror Technologies' six-pack. NEC's Gallery, which includes seven CD titles (CD Companion Series: Beethoven Symphony No. 9; Desert Storm; Cinderella, The Original Fairy Tale; Cosmic Osmo; The Software Toolworks World Atlas; Grolier's Illustrated Encyclopedia; and Time Table of History: Science and Innovation), headphones, and speakers, adds \$107 to the cost of the NEC InterSect CDR-37 and \$159 to the cost of the InterSect CDR-74. The Procom bundle, which includes seven titles (Sherlock Holmes, Consulting Detective; The Software Toolworks World Atlas; The Software Toolworks Illustrated Encyclopedia; CD Companion Series: Mozart String Quartet in C Major; Introduction to Nautilus; The Mega-ROM; and the Procom audio sampler)

plus headphones and speakers, is an extra \$204. The Mirror six-pack (Grolier's Illustrated Encyclopedia; The Software Toolworks World Atlas; Time Table of History: Science and Innovation; US History; Desert Storm; The Orient) is \$189 (with no extra hardware). These bundles are excellent deals, since each title retails for \$39 to \$395.

Price

PICKING A CD ROM DRIVE IS A QUESTION of deciding how much speed you can afford, followed closely by software and support. The NEC InterSect CDR-74 is one of the fastest drives in our tests, and offers the best video performance. It retails for \$712—not the cheapest drive, but overall the top pick.

In the budget category, I eliminated the MacProducts Magic CD-ROM (\$599) because it has only the clumsy playCD stack for audio playback, the Procom MacCD/LX (\$595) because of a low tech-

CD ROM DRIVE FEATURES

	GENERAL Tested by Macworld Lab	Product (mechanism manufacturer) ¹	List Price (includes Mac interface)	Average Access Time	Transfer Rate (in KBps)	Buffer Size	Double Dust Door	Vertical Orientation
Apple Computer	●	CD150 (S)	\$599	380ms	150	64K	○	○
CD Technology	●	Porta-Drive (T)	\$795	325ms	150	64K	●	○
DynaTek Automation Systems	●	CDS 650 (S)	\$895	380ms	150	64K	○	○
Hitachi Home Electronics	●	CDR-1750S (H-1750)	\$915	300ms	153.6	64K	●	○
Liberty Systems	●	115 CD-ROM (S)	\$699	380ms	150	64K	○	○
MacProducts USA	●	Magic CD-ROM (T)	\$599	380ms	153.2	64K	●	○
MicroNet Technology	○	Micro/CD-ROM (S)	\$995	350ms	150	64K	●	●
Mirror Technologies	●	CD-ROM Drive (T)	\$599	325ms	153.6	64K	●	○
NEC Technologies	●	InterSect CDR-37 (N)	\$485 ²	450ms	150	64K	○	○
	●	InterSect CDR-74 (N)	\$712	280ms	300 ⁴	64K	●	●
Optical Access International	●	Performer CD ROM (M)	\$699	500ms	153	32K	○	○
	●	Allegro CD ROM (T)	\$899	310ms	153	64K	●	○
Panasonic Communications & Systems	●	LK-MC501S (M)	\$875 ⁵	500ms	153	32K	○	○
PLI	●	CD-ROM (S)	\$699	380ms	150	64K	○	○
Procom Technology	○	MacCD/LX (S)	\$595	380ms	150	64K	○	○
Relax Technology	●	Vista CD-ROM (T)	\$579	325ms	150	64K	●	○
Sony Corporation of America	●	CDU7211W (S)	\$950	380ms	150	64K	○	○
Texel America	●	DM5021 CD-ROM (SH)	\$543	340ms	150	64K	○	○
Todd Enterprises	○	TCDR-7050 (H-3750)	\$1010	300ms	153.6	64K	●	○

● = yes; ○ = no. ¹ H = Hitachi, M = Matsushita, N = NEC, S = Sony, SH = ShinaKen, T = Toshiba. ² 12-14 = excellent, 9-11 = very good, 7-8 = good, 5-6 = satisfactory.

nical-support rating, and the Relax Vista CD-ROM (\$579) for a low technical-support rating and the lack of preamp audio output jacks. The fast Mirror CD-ROM Drive (\$599), with its good manuals, software bundle, and service rating, therefore emerged as my top budget pick.

The Sony-based Apple CD150 (\$599) and the Procom MacCD/LX (\$595) are my next choices. They both offer respectable performance for a reasonable price, and have slightly smoother video performance than the Toshiba-based drives. If you're looking for a drive primarily to play QuickTime movies, and you can't afford the InterSect CDR-74, buy one of these.

Is It Time to Buy?

PRICES AREN'T LIKELY TO FALL MUCH farther for CD drives. Instead, at the top of the market we'll begin to see drives with additional features (see "Kodak's Photo CD"). More drives that double the data-transfer speed will also appear on the

MW

EDITORS' CHOICE

High Performance

InterSect CDR-74 This drive offers speedy performance and smooth video, comes with Trantor's driver and Music Box Software, has a second door for dust prevention, and offers good technical support. For an extra \$159 you get five CD titles, a pair of speakers, and headphones. **Company:** NEC Technologies. **List price:** \$712.

Budget Choice

Mirror CD-ROM Drive This drive comes with a fast Toshiba mechanism, driver and Music Box software from Trantor, solid technical support, a second dust door, and a good manual. And for an extra \$189 you get a six-pack of excellent CD titles. **Company:** Mirror Technologies. **List price:** \$599.

market soon. Sony has announced the CDU-561, a double-speed mechanism with an expanded 256K buffer that should be available in late 1992. Texel America will be replacing its DM5021 CD-ROM with the DM5024, a 280ms double-speed drive (\$658) by September 1992. In early 1993 Optical Access will be updating its Performer to a new 350ms mechanism with an automatic eject feature, and its Allegro will debut with a 275ms access time, double-speed data transfer, and a 256K buffer.

I've always felt that the trailing edge of high technology is where the bargains are. Right now, CD ROM drives offer the best performance for the lowest prices ever, and more titles are available than ever before. Now is a good time to buy in on a sure thing. **m**

See *Where to Buy* for contact information.

Macworld Lab testing supervised by TIM WARNER.

Internal Fan	Type of Indicator Lights	Can Read 1st Sessions of Photo CD	SOFTWARE			SUPPORT	
			Driver	Bundled Titles	Audio Software	Support Rating ²	Warranty (in months)
○	power/busy	●	Apple CD Setup	Educorp CD Sampler, Introduction to Nautilus, Apple CD-ROM, Titles Sampler	CD Remote DA	NA	12
○	busy	○	CD Tech (OMI)	none	playCD and CD Remote DA	10	parts 24; labor 12
●	power/busy	●	OMCD-S (OMI)	none	playCD	NA	12
○	power/busy/disc	○	Hitachi CD-ROM (Trantor)	none	Hitachi CD DA	2	12
●	power/busy	●	TSLCDDrvr (Trantor)	none	Music Box DA	13	12
○	power/busy	○	Toshiba CD ROM Driver (OMI)	Discovery Animation Showcase	playCD	9	12
●	power/busy	●	TSLCDDrvr (Trantor)	none	Music Box DA	NA	12
○	busy	○	TSLCDDrvr (Trantor)	Introduction to Nautilus	Music Box DA	9	12
○	power/busy	○	NECCDDrvr (Trantor)	none	Music Box DA	10	parts 24; labor 12
○	power/busy	○	NECCDDrvr (Trantor)	none	Music Box DA	10	parts 24; labor 12
○	power/busy	○	Access Performer INIT	Introduction to Nautilus; The Font Company CD; ABCD-ROM	Access CD Player DA	13	12
○	power/busy	○	Access Allegro INIT	Introduction to Nautilus; The Font Company CD; ABCD-ROM	Access CD Player DA	13	12
●	power/busy	○	none ⁵	none ⁵	none ⁵	2	12
●	busy	●	PLICDDrvr (Trantor)	Introduction to Nautilus	Music Box DA	11	12
○	busy	●	Procom CD-ROM Drvr	none	CD Audio DA/CD Player	5	12
●	power/busy	○	TSLCDDrvr (Trantor)	Introduction to Nautilus	Music Box DA	5	12
○	busy	●	none	none	none	2	12
○	busy	○	TSLCDDrvr (Trantor)	none	Music Box DA	NA	12
●	power/busy	○	TSLCDDrvr (Trantor)	none	Music Box DA	6	24

1-4 = poor, <1 = unsatisfactory, NA = support offered through dealer only. ³ Battery pack \$99. ⁴ Audio-transfer rate is 150 KBps. ⁵ Mac interface available in July 1992, \$149.

ALL ABOUT SCANNERS

UNLESS YOU'RE A DESKTOP PUBLISHER OR A prepress operator, you probably don't own or have easy access to a scanner. But if present trends are any indication, that situation is about to change.

Thanks to the continuing, significant decline in scanner hardware prices, many people who thought they would never want a scanner—those who work primarily with word processing, spreadsheet, presentation, and database applications—are going to find scanners difficult to resist. Consider this: Two years ago, the majority of 24-bit, 300-dots-per-inch color scanners cost from \$7000 to \$9000. This fall, Microtek plans to ship the ScanMaker II, which could be the first 24-bit, 600-dpi color flatbed scanner boasting a street price of about \$900.

There are other encouraging developments, too, that could make a scanner a must-have. The technology is improving, as many manufacturers are selling scanners capable of higher resolutions and better image quality than previous, higher-priced versions. And a new generation of software with automatic controls is making scanners easier to operate for someone with little graphic-arts or desktop-publishing skill.

Before you take the plunge into scanning, there are important decisions to make. Should you buy a flatbed model, or will a hand-held device do the job? Do you need color, or can you get by with gray scale or black and white? Is the advertised scan resolution real or simulated? Should you care about three-pass versus one-pass scanning? Do you need new features like Twain support, or added features like optical character recognition (OCR) and image-editing software?

Hand-Held or Flatbed?

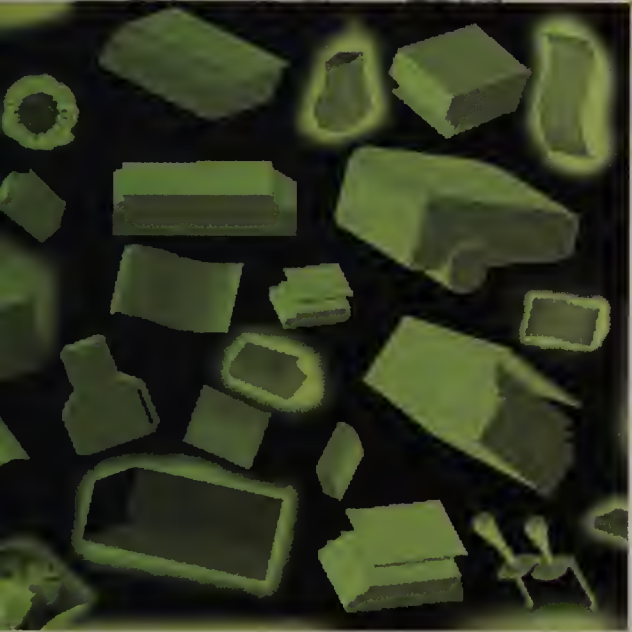
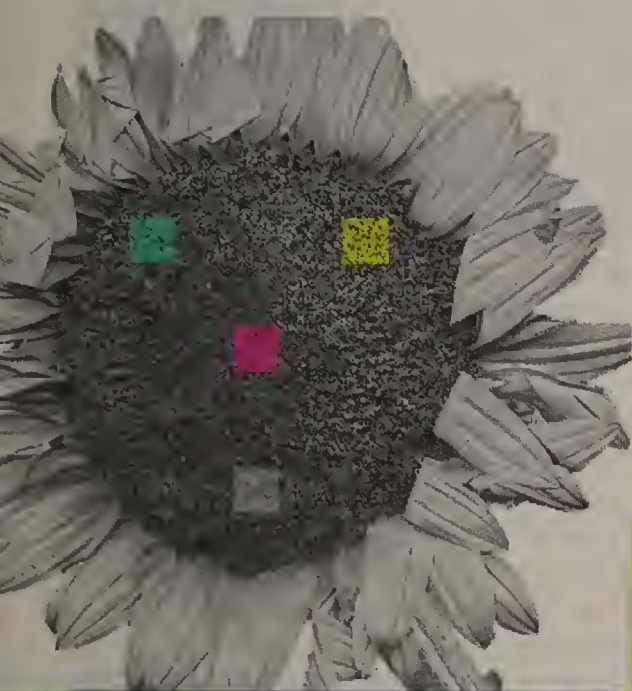
THERE ARE SEVERAL TYPES OF SCANNERS FOR THE Macintosh: hand-held, flatbed, slide, sheetfed, overhead, and drum. Because they're generally low-priced and well suited to a variety of applications, flatbed and hand-held scanners are the most common choices for first-time and general-use scanner buyers. (For an overview of the other scanner technologies, see "A Scanner Sampler"; for a review of slide scanners, see "Seeing Through Slide Scanners" in this issue.)



BY JAMES A. MARTIN

Pros and cons of hand-helds Because they're inexpensive (it's easy to find one for about \$300), hand-held models can be an ideal way to get into scanning without making a hefty investment. They're small (typically about 4 inches wide), so you can keep them in a drawer or hang them on the side of the Mac to free up desk space. Hand-held devices are portable, so you can take one on the road with your laptop (battery-powered hand-held scanners are rumored to be in the works). The method of scanning (you slowly drag the device over the object to be digitized) also lets you scan some objects you otherwise couldn't—the logo on the side of a large box, for instance.

Now the bad news. Because you must sweep a hand-held unit's scanning head over a graphic by hand, it's easy to end up with waves or other align-



JOHN HERSEY

ment problems. And if you move the scanner too quickly, you run the risk of a jerky image, since the scanner's memory buffer gets full and misses some of the image data. With practice, some deep breathing, a decaffeinated life-style, and no sneezing, you can minimize—but not eliminate—these problems.

While a hand-held device's size is an advantage, it's also a limitation, as it prevents you from easily scanning images larger than 4 inches wide. To scan larger images, you must scan one 4-inch section at a time, then combine—or *stitch*, in scanning parlance—the pieces together on screen. This is an awkward process, and the graphic often reveals the seams of your stitching on close inspection.

Still, gray-scale hand-held scanners make sense for someone on a tight budget, who works primarily

with low-resolution (laser-printed) output, needs a portable device, and doesn't usually need to scan images larger than 4 or 5 inches wide.

As for color hand-held scanners, don't even think about buying one except for the kids. With the prices of some color flatbed scanners hovering around \$1000, color hand-held models (which retail for \$700 to \$900) are getting squeezed out of the market. Mouse Systems, Sharp, and NCL America are among those dropping their color hand-held scanners.

Pros and cons of flatbeds For several reasons, a flatbed scanner is clearly the better choice.

First, there's a greater diversity of models and features from which to choose. At the high end are \$8000 to \$10,000 color flatbeds that can scan originals up to 11.7 inches by 17 inches at resolutions of 1200 dpi and higher; some include an attachment for scanning transparencies. At the other end of the spectrum are 300-dpi, 8-bit gray-scale models that usually don't include any transparency or sheet-feeder attachments (but they're often available as options), are

Scanners come in several forms— which is right for you?

limited to scanning originals up to 8.5 inches by 11 or 14 inches, and cost from \$900 to \$1300.

Second, flatbed scanners usually offer better-quality scans than hand-held devices do. Most hand-held devices, for example, use a technique called *interpolation* that results in coarser images (more on interpolation later).

Third, it's easier to align images on a flatbed because the scanner head records the image by moving underneath the graphic (like a photocopier's mechanism does) rather than by having you rake the scanner over the graphic by hand.

So what's wrong with flatbeds? Most important, they cost more than hand-helds. And all too often, the scanner's software interface is unfriendly, particularly to inexperienced users.

Also, the quality of scans often varies from one model to another, despite the fact that their guts may have been engineered by the same manufacturer—the variations ordinarily arise from differences in their software interfaces and image-quality controls. If you have several scanners in-house, this can lead to inconsistent results even for the same image.

Still, in the long run, a flatbed model is the better scanner investment, even if you're in a cash squeeze. Once you buy a scanner, you will find uses for it that you didn't anticipate. And the more you scan, the more you'll begin to resent the limitations of a hand-held device.

Gray-Scale or Color?

BECAUSE THE PRICES OF COLOR SCANNERS HAVE dropped so dramatically, why buy a gray-scale scanner when a color model doesn't cost much more? Why, indeed.

When you consider that the cost of color printers is also nose-diving, color scanners take on an even

stronger allure. Meanwhile, some vendors are working on ways to improve and simplify the processes of color scanning and printing. Savitar's ScanMatch program (\$199), for instance, promises to match the RGB (red, green, and blue) values of the image you see on a monitor's screen to the color values of the original scanned graphic. From there, Adobe Photoshop's calibration options fine-tune how Photoshop converts the RGB colors to the CMYK process-color values of the intended output device. In addition,

Beware that claimed resolution may not be true resolution

ColorSync, the color management system in Apple's upcoming QuickDraw GX, promises to provide color consistency between the Mac and its peripherals; QuickDraw GX is scheduled to be available later this year. And Light Source plans to release later this year a color version of its ground-breaking Ofoto software that will automate many color-calibration tasks.

Your best bet is to pay a little more for a color scanner now rather than try to save money by buying a less-expensive, gray-scale model that you'll soon outgrow. You can still scan in gray-scale and black-and-white modes with a color scanner, and then advance into color graphics when you're ready.

Understanding Optical Illusions

A GROWING NUMBER OF INEXPENSIVE FLATBED scanners are offering the ability to scan images at resolutions above 300 dpi. But beware that what a

company claims to be a scanner's true resolution is not always what it really is.

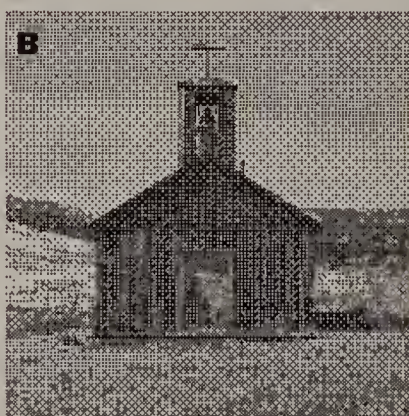
As mentioned earlier, many scanner vendors are using a technique called interpolation to boost perceived resolution. In interpolation, the scanning software creates extra pixels by calculating the range of hues (levels of color or gray) between the pixels it actually sees. For example, if a scanner sees 100 pixels per inch, it may calculate 300 pixels per inch by dividing each pixel it sees into three smaller pixels. It also adjusts the hue of the newly created smaller pixels to make the shift between hues appear smooth. (A scanner's actual resolution is limited by its array of charge-coupled devices, or CCDs—tiny silicon elements containing photon detectors that convert light reflected from an image into pixels the computer understands.)

Interpolation is useful when enlarging a color or gray-scale image after scanning it. Without interpolation, the pixels that make up an image scanned at, say, 300 dpi become more visible the more you enlarge the image. With interpolation used to scan it in at 600 dpi, that same image—because it has more pixels—is less likely to have an undesirable pixelated (blocky) quality when enlarged.

People who regularly scan line art (black-and-white drawings, for example) will also find interpolation to be an advantage. Line art is characterized by fluid lines and curves, which at lower resolutions run the risk of being plagued by aliasing (jaggies).

Because interpolation creates additional pixels by dividing existing pixels, it smooths out the jagged lines. But the process doesn't enhance the level of detail in an image. Thus, a shadowy image with poor

How Gray-Scale Interpolation Works



In interpolation, the original image (A) is sensed by the scanner hardware as a pattern of black and white dots (B), which the scanner software translates to gray levels (C). The interpolated result can be slightly muddier than the original.



In true gray-scale scanning, the scanner hardware detects the levels of gray in the original image (A) and assigns the level detected to each pixel when creating the image file (B).



The La Cie Silverscanner (top) and Hewlett-Packard ScanJet IIp both offer higher resolution through interpolation.

Scanning Methods

ANOTHER MARKETING CLAIM TO CONSIDER IS THE difference between *one-pass* and *three-pass* scanning.

One-pass scanners generate RGB values by using three separate lights that flash on and off throughout the scanning process. As the scanning mechanism moves across the image, the scanner's internal red light comes on to capture the image's red information. After the red light shuts off, the green light comes on to capture green, then shuts off so the blue light can follow the same procedure. Thus, the scanner captures the color information in one pass.

A three-pass scanner uses one light source and three color filters to create RGB values. The scanner head passes along the image three times, once while the red filter is in position, again for the green filter, and so on. The scanner's internal lamp comes on to

contrast at 300 dpi won't reveal any additional, subtle photographic details when interpolated to 600 dpi; it just won't look aliased.

Unfortunately, some vendors aren't always upfront about interpolation. Often, a manufacturer claims its scanner offers 600-dpi resolution when in fact the scanner has 600-dpi vertical resolution and 300-dpi horizontal *optical*, or *true*, resolution; the scanner's 600-dpi horizontal resolution comes through interpolation.

Although a 600-by-300-dpi scanner with interpolation creates a better-looking image than does a 300-by-300-dpi model, don't assume your image will look as sharp as one from a scanner with true 600-by-600-dpi resolution. When shopping for a scanner, ask what its optical resolution is.

Also, don't get too carried away with high resolutions. The higher the resolution, the more memory the image requires, and the more processing time the Mac needs to print, rotate, scale, or redraw the image. Considering the system resources required to handle them, high-resolution scans—for someone who isn't doing color prepress or other high-end work—are more trouble than they're worth. For general use, a 300-dpi scanner is more than adequate.

Interpolation is an issue not just in resolution but in gray (and color) levels too, especially for hand-held scanners, since interpolation lets manufacturers keep down the weight and price by using fewer and less-expensive components. Many hand-held scanners can see only black and white, so they use *dithering*—creating a series of black and white dots to simulate gray—when scanning photographs. They then use interpolation to reconstruct the gray levels. A true gray-scale scanner, by contrast, assigns an actual gray value to each pixel (see “How Gray-Scale Interpolation Works” for a visual explanation of this process). So what's the difference? A black-and-white hand-held device is fine for scanning line art or text and images for on-screen presentations and some laser-printed output. But the gray levels it generates won't have the depth and clarity of an image scanned on a true, gray-scale scanner, particularly if output on an imagesetter.

When shopping around, check if the scanner achieves gray scale by interpolation (usually through software) rather than by true gray-scale detection.

A Scanner Sampler

Aside from flatbed and hand-held devices, there are several other scanning technologies for the Macintosh, ranging in price from \$250 for hand-held scanners to more than \$70,000 for prepress scanners.

Sheetfed scanners, such as Microtek's MS-II (\$1195), are similar to fax machines in that you feed the original page into a slot, where rollers move the page over the scanner's stationary light source and charge-coupled device (CCD) array. Thunderware's ThunderScan Plus (\$249) is an unusual example of this genre: its hardware replaces the ribbon cartridge in an ImageWriter, turning the printer into a sheetfed scanner. Sheetfed scanners are ideal for OCR applications and light desktop publishing but are limited by supporting few page sizes. It's also easy to inadvertently insert a page at an angle.

With overhead scanners, the scanning head and CCD array are mounted over the platen (glass) to capture the image from above rather than from below (as traditional flatbed scanners do). With this method, you can capture 3-D materials (a telephone, for example), but because light is projected onto the object, high-quality scans are difficult to obtain. Truvel sells a 24-bit color overhead scanner, the TruScan 3D Color Scanner, beginning at \$8695.

With slide scanners, a piece of film is placed in a slot inside the scanner; light is directed through it and into the CCD array. The results are highly saturated colors and a greater level of detail than you'd get with a reflective scan (with a typical flatbed scanner). Dedicated slide scanners are frequently used for color prepress and other high-end photographic applications and usually offer greater resolution than do traditional flatbed scanners with transparency options. Barneyscan Corporation's \$4495 CIS 3515 and Nikon's LS-3510AF Film Scanner (\$9535) are two examples of 35mm slide scanners.

Drum scanners are the most expensive, and advanced, scanners for the Macintosh. They originally were available only for high-end Crosfield, Linotype-Hell, and Scitex prepress systems. With this drum process, the original transparency or reflective art is mounted on a scanning drum, while the photographic film to be exposed is mounted on an exposing, or recording, drum. A small spot of light illuminates the copy being made on the film; as the scanning drum rotates, the light spot scans a fine line of copy for every resolution. The result is an extremely-high-quality scan. Because they're expensive—consider that Howtek's Scanmaster D4000 unit represents a significant price breakthrough at nearly \$40,000—not to mention complicated to operate and maintain, drum scanners aren't recommended for anyone other than high-end desktop publishers and service bureaus.

record the red information, goes off, comes back on for the green information, then repeats the process for the blue information.

Some scanner vendors are moving toward the one-pass method for several reasons. One is that these devices can sometimes scan faster than three-pass models. (Because implementations often differ widely, there's no guarantee that a particular product will be faster than another.) Another reason is that a one-pass scanner, because it digitizes the image in one fell swoop, is often less likely to cause registration problems than is a three-pass scanner.

But a one-pass scanner sometimes creates slightly fuzzier scans than a three-pass model does. Because a one-pass scanner uses three lamps that flash on and off, it can introduce lighting errors into the process, which translate into reduced sharpness.

Ultimately, the one-pass versus three-pass debate shouldn't be a substantial consideration for anyone buying an inexpensive color scanner. Indeed, don't worry about speed at all—generally, the slower the scan, the better the results.



PAUL BERG

Hand-held scanners are convenient for occasional use. Shown here are (clockwise from top left) the Logitech ScanMan, Thunderware ThunderScan, and Caere Typist, an OCR product.

WHO SELLS SCANNERS UNDER \$3000

Company	Hand-Held Scanners		Flatbed Scanners		
	Black-and-White	True Gray-Scale	Gray-Scale	Color/Gray-Scale	Optional Flatbed Attachments
Abaton ¹	○	○	●	●	○
Advanced Vision Research	○	○	●	●	ADF, S
Animas ²	●	●	○	○	○
Apple Computer	○	○	●	○	○
Caere Corporation	● ³	○	○	○	○
The Complete PC	○	●	○	○	○
Computer Friends	○	○	○	●	S
Epson America	○	○	○	●	○
Fujitsu Computer Products	○	○	○	●	ADF
Hardware That Fits	○	○	○	●	S
Hewlett-Packard	○	○	●	●	ADF
Howtek	○	○	○	●	○
HSD Microcomputer USA	○	○	●	●	ADF, S
La Cie, a Quantum Company	○	○	○	●	○
Logitech	● ³	○	○	○	○
Marstek	○	●	○	●	○
Microtek	○	○	○	●	ADF, S
Mirror Technologies	○	○	○	●	ADF
New Dest Corporation	●	○	●	○	ADF
Nisca Corporation	○	○	○	●	○
Our Business Machines	○	○	●	●	ADF
Panasonic	○	○	●	○	ADF
Pentax Technologies	○	○	●	○	ADF
Prime Option	○	○	●	●	ADF
Relax Technology	○	○	○	●	S
Sharp Electronics Corporation	○	○	○	●	S
Tamarack/Artix Technologies	○	○	○	●	S
Thunderware	● ³	●	○	○	○
Umax Technologies	○	○	●	●	ADF, S
XRS	○	○	○	●	ADF, S

● = yes; ○ = no.

ADF = automatic document feeder, used for optical character recognition (OCR) applications.

S = slide or transparency mount. ¹ A subsidiary of Everex Systems. ² A subsidiary of Mouse

Systems. ³ Gray levels simulated through software interpolation.

Improved Ease of Use

NO MATTER HOW INEXPENSIVE, ADVANCED, OR efficient scanners become, they aren't worth much if you can't easily operate them. With this in mind, Light Source developed Ofoto, a breakthrough program that automates a variety of gray-scale scanning functions and controls so that anyone can get acceptable results with a minimum of pain. (For more on Ofoto, see "OneScanner," *Reviews, Macworld*, February 1992.)

Ofoto (bundled with some scanners and available as a separate program for others) automates most common scanning tasks. For example, Ofoto scans and sharpens an image, straightens it on screen (in case you've inadvertently inserted the original at an angle), and crops the white space around the image. Most important, Ofoto determines for you the image's best scanning resolution and bit-depth values (hue or levels of gray) for the intended output device—a task that has perplexed many scanning novices. This ensures that you get the best-quality output on your printer, without scanning an image at a needlessly high resolution.

In addition, Ofoto offers some basic image controls (rotating, inverting, scaling, and flipping), although you still need Adobe Photoshop or Micro-Frontier's Enhance to perform any sophisticated image enhancement (such as blending pixels to rid an old photograph of its scratches).

As is the case with auto-everything 35mm photography, you get the best results from Ofoto by taking the time to learn how to adjust controls yourself, as not every scanning job is the same. (Ofoto offers manual control options as well as automatic mode.)

Ofoto is not alone in tackling ease-of-use issues. Flamingo Bay's new ScanPrep Resolution Calculator (\$275) calculates resolution for gray-scale and color flatbed scanner users. Tell the program the

resolution of your scanner, the dimensions of your original image, and its final output size, then answer a few multiple-choice questions, and ScanPrep tells you the optimum resolution at which to scan your image. Flamingo Bay sells ScanPrep versions for use with transparency scanners and for transferring high-end scans from a Linotype-Hell or Crosfield system to the Macintosh for PostScript output.

Perhaps taking a cue from Ofoto, Hewlett-Packard recently began shipping an enhanced version of its DeskScan utility for the HP ScanJet IIP and IIc. DeskScan was originally shipped with HP's ScanJet Plus and included the Auto Exposure feature, which automatically adjusts brightness and contrast. For the latest DeskScan version, HP has added AutoFind, which determines if an image is continuous-tone or line art so it can switch automatically to gray-scale or black-and-white mode. DeskScan also now lets you easily select a calibration path.

While they aren't perfect—Ofoto's autocropping feature rarely eliminates precisely what you want it to, and DeskScan, while much improved, can still be cryptic for neophytes—these programs are ultimately as important as price cuts in making scanners accessible to a wider number of users.

There's another ease-of-use development for scanner users—called Twain—but at the time of this writing, it was still on the horizon. Developed by Hewlett-Packard, Caere, Aldus, Logitech, and Eastman Kodak, Twain is an application program interface and protocol—a kind of political unification between scanning hardware and software. (Hence the name: *twain* means “two,” as in “never the twain shall meet.”) Twain's promise is to let you input an image directly into any DOS or Mac application, as long as both the program and the hardware support Twain. This would work like Photoshop plug-ins but would not be application-specific.

Several companies have announced support for Twain in upcoming products, but ultimately, Twain will most likely benefit product developers more than you or me. The ability to scan directly into an application probably won't be a major advantage to most. With System 7's Finder—which lets you open as many programs as your Mac's memory allows—and enough memory (at least 8MB), moving between an application and a scanning utility on the Mac is only a matter of a few mouse-clicks, anyway.

Bundles and Add-Ons

PEOPLE DON'T SCAN IN A VACUUM—THEIR IMAGES are meant to be used for real projects—so scanner vendors are increasingly bundling with their scanners valuable software programs—among them, Micro-Frontier's Enhance, Aldus Consumer Division's Aldus Digital Darkroom, and Ofoto for gray-scale images, and Adobe Photoshop and Letraset's ColorStudio for color scanning.

But many vendors bundle only limited editions of some software. Photoshop LE (Limited Edition), for example, which comes with many scanners, lacks the full-blown color-separation capabilities of Photoshop. But it's fine for anyone not involved in prepress work, which means that it's fine for most business users.

If you're buying a scanner for your office or department, you might consider a model that offers an automatic document feeder option, which lets you easily scan pages of text for OCR purposes. OCR packages have shown strong signs of improvement recently. (For a review of OCR packages, see “From

Together, words and images are an unbeatable combination

Page to Pixel,” *Macworld*, July 1992.) A document feeder can add about \$400 to the cost of your scanner, and an OCR package will set you back another \$300 to \$900, depending on its sophistication.

No Need to Wait

IF YOU'RE WAITING FOR COLOR SCANNERS TO COME down even further in price before you buy, that's fine. But as with any computer device, you can count on the fact that tomorrow there will be something cheaper and better than what you buy today—which means you might end up never making a move.

And that would be too bad, for scanned images can enliven your documents and presentations, offering images where words just aren't enough. The simple truth is that together, words and images are an unbeatable combination. **m**

See *Where to Buy* for contact information.

Scanners in Focus

Looking for further information on scanners? Here's where to start.

The October 1991 issue of *Macworld* contains a Macworld Lab review of 13 gray-scale flatbed scanners (“Scanners in View”). The June 1991 issue of *Macworld* offers a review of 15 low- to mid-priced color flatbed scanners (“Affordable Color Scanning”) and 8 hand-held models, including black-and-white, gray-scale, and color (“One in the Hand”).

The Verbum Book of Scanned Imagery, by Michael Gosney, Linnea Dayton, and Phil Inje Chang (M&T Books, \$29.95), explains scanning technology in easily understandable terms, offers how-to advice, and includes plenty of sample scanned images.

The Complete Scanner Handbook for Desktop Publishing: Macintosh Edition, by David D. Busch (Business One Irwin Books, \$24.95), provides an overview of scanner technology and is aimed at entry-level scanner users. Busch's companion volume, *The Complete Scanner Toolkit: Macintosh Edition* (Business One Irwin Books, \$34.95, with disk) offers how-to information for more-advanced users. A follow-up book, *David Busch's Hands-On Hand Scanner Book*, is due this fall from the same publisher.

Macworld Complete Mac Handbook, by Jim Heid (IDG Books Worldwide, \$26.95), includes a chapter on scanners that provides useful information on how they work as well as tips for getting the best results.

Image '92 is a three-day seminar devoted entirely to the subjects of color and gray-scale scanning, desktop stripping, and color separations on the Macintosh. The seminar, aimed at graphic designers, prepress technicians, and anyone with at least some knowledge of scanning, is held in major cities around the country throughout the year and costs \$595. For more information, call ImageXpress at 404/979-8811.

Seeing Through Slide Scanners

Macworld

Lab tests 13

scanners

that digitize

slides and

transparencies

USERS OF TRANSPARENCY SCANNERS are a varied lot. Artists, archivists, print-production people, designers, business-people with slide presentations, multimedia producers—each group has different hardware and software needs. But whatever the job, scanner users want the best image quality possible at the price they can afford to pay.

To sort out how to find a scanner that does the job you need done, and to determine which units deliver the best scans, Macworld Lab tested 13 scanners for ease-of-use and speed, and applied a half-dozen tests for quality-related criteria such as sharpness, color fidelity, and *dynamic range*—the ability to capture shadow and highlight detail. The price cutoff for this roundup was \$16,400; we looked at any model below that price that can scan transparencies, including 5 dedicated slide scanners, 8 flatbeds with transparency attachments, and a couple of inexpensive hybrid designs.

Types of Scanners

35MM SLIDE SCANNERS ARE STRAIGHT-forward to use: open the door on the bread-box-shape device, slip the slide into metal clips on a movable stage, close the door, and scan. These scanners do only

one thing—scan 35mm slides and negatives—but they generally do it better than all but the most expensive flatbeds.

Flatbed scanners resemble small photocopy machines. You open the cover, lay the artwork on a glass platen, close the cover, and scan. Most of the transparency attachments in this review replace the scanner cover with a panel that opens and closes on a hinge and illuminates the transparency from above. A few units do away with the cover altogether and simply suspend a light source above the scan bed.

In either case, flatbed transparency attachments are awkward, retrofit affairs. To use them with slides you have to do things like cut windows in plastic sheets to make masks (these stop light from flooding the image), unmount the slide, and then tape the slide to the mask and the mask to the scanner. And only expensive flatbeds have resolution ratings approaching those offered by inexpensive, dedicated 35mm scanners.

The advantage of flatbeds with transparency units is that they can scan just about anything in the two-dimensional world, from X-ray film to watercolor sketches to dried flowers. One would like to say that flatbeds with attachments can do the job of two scanners, but the limited resolution and image quality of all but the most expensive models makes these cross-breeds feel more like one-and-a-half machines. Unfortunately, flatbed makers tend to price transparency units as though they were half a scanner.

Coming to a Resolution

SCANNER RESOLUTION RATINGS TELL you how many image measurements, or samples, a scanner makes per inch. A higher-resolution scanner typically can produce bigger, sharper images. But scanner makers charge high prices for high resolution. How much resolution is enough for your needs?

The answer depends entirely on how you're going to use your scans. Producing film separations for print is a resolution-hungry application. If this is your reason for buying a scanner, the easiest way to figure out your resolution needs is to check the table "Resolution and Print Dimensions," which shows the maximum enlargements possible from a 35mm slide using various scanners and assuming some typical halftone resolutions. As you can see, 600-dots-per-inch resolution is the bare minimum for 35mm slides intended for print.

Printing to a film recorder also requires lots of data. If you use a 35mm recorder, look for a scanner that has resolution at least equal to the resolution you use for film-recorder output.

BY JOE MATAZZONI

Image sharpness increases progressively as scan resolution approaches twice that of the output figure; after that, you get diminishing returns.

People who make scans for on-screen display don't have to worry much about resolution unless they typically crop slides severely. The smaller the image scanned, the higher the scanning resolution required to enlarge the image. The only scanners in this article that can't produce a photographic-looking image larger than an Apple 13-inch monitor are the Raster-

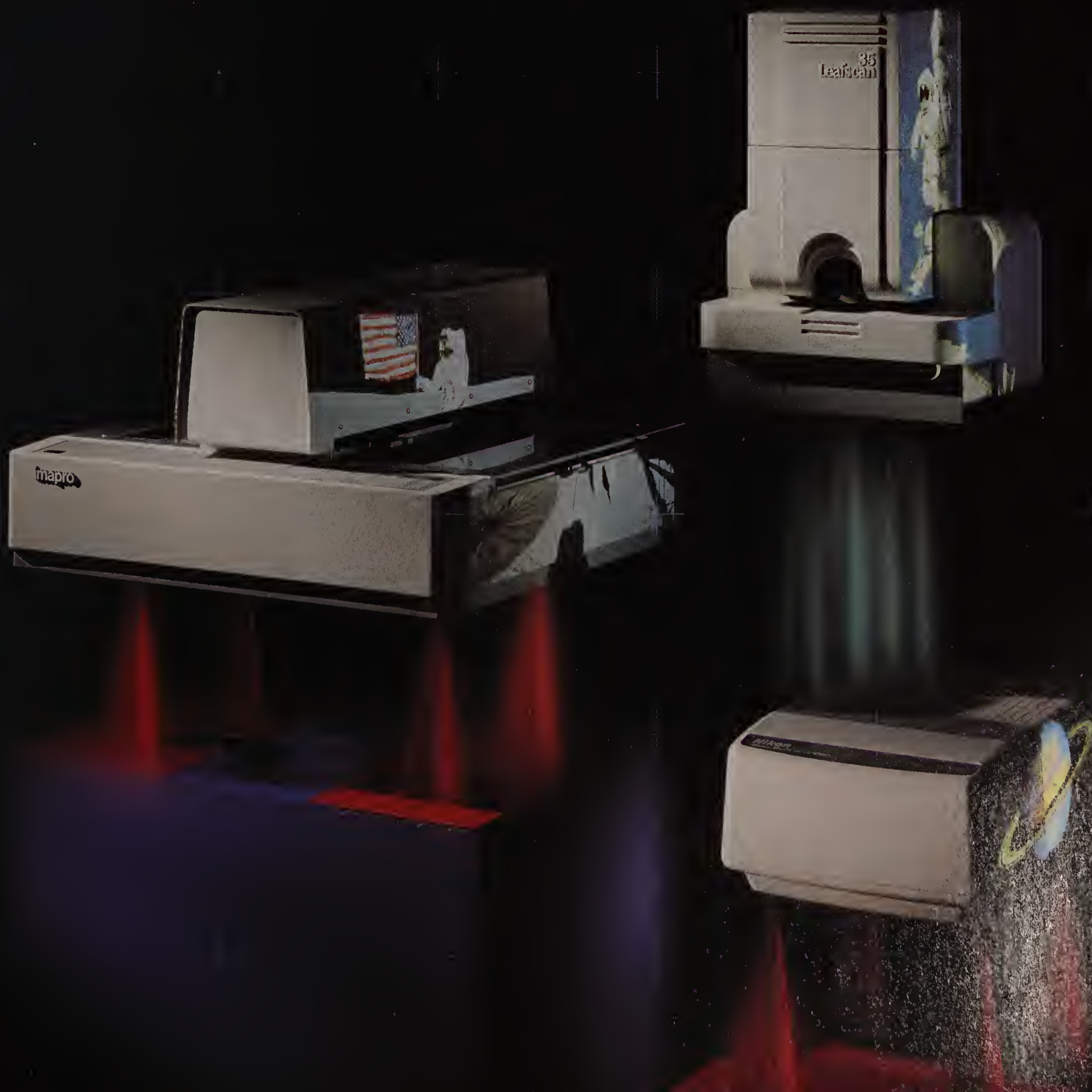
Ops Expresso Personal Slide Scanner and the Niscan Spectra.

When comparing scan-resolution ratings, be sure the number you're looking at is the *optical resolution*. Scanner makers and salespeople have a bad habit of quoting figures for *interpolated* or *nonproportional* resolutions instead. Interpolation is an image processing technique by which a program simulates a higher resolution than the scanner actually captures—helpful for avoiding jaggies when you blow up a scan beyond its normal limits. But like

most synthesized commodities, interpolated data is a poor substitute for the real thing.

Nonproportional scanners collect more data in the vertical direction than in the horizontal one, then use interpolation to build up the resolution on the weak side. Nonproportional files offer about the same amount of image detail as scans with a resolution midway between the nonproportional rates. So, having a 300-by-600-dpi scanner is almost as good as having a 450-dpi machine. The disadvantage

Among the top scanners: The Imapro QCS-600 (left), the LeafScan 35 (top), and the Nikon LS-3510AF Film Scanner (bottom).



is that the files you create take up as much space as 600-dpi files—about 78 percent more space than 450-dpi files.

Tonal Control: Hardware Factors

ANYONE WHO HAS USED A GOOD camera knows that taking good pictures involves adjusting exposure. Scanners have much more flexible controls than cameras, but the idea is the same: adjusting the scanner so that it responds differently to different slides is essential to making optimal scans.

This is true not only because slides vary considerably, but also because all slides contain a lot more visual information than Mac scanners can capture. A 24-bit scan captures 256 shades (8 bits) per red, green, and blue color channel, while a color transparency can contain thousands of shades per color. Without the ability to adjust the scanner's tonal response, your chances of capturing the 256 shades that best represent the slide's information are slim. Unadjusted scans typically miss shadow detail or drop the high-light information—or both.

RESOLUTION AND PRINT DIMENSIONS

Input (device) Resolution	Output (effective) Resolution			
	128 dpi (85 lines at 1.5:1 ratio)	200 dpi (133 lines at 1.5:1 ratio)	225 dpi (150 lines at 1.5:1 ratio)	300 dpi (150 lines at 2:1 ratio)
600 dpi (Imapro QCS-600)	4.4" × 6.6"	2.8" × 4.3"	2.5" × 3.8"	1.9" × 2.8"
1000 dpi (Barneyscan CIS 3515)	7.4" × 11"	4.7" × 7"	4.2" × 6.3"	3.1" × 4.7"
1850 dpi (Microtek ScanMaker 1850S)	13.6" × 21.2"	8.7" × 13.1"	7.8" × 11.7"	5.8" × 9"
3175 dpi (Nikon LS-3510AF)	23.4" × 35"	15" × 22.5"	13.3" × 20"	10" × 15"
4000 dpi (Leaf LeafScan 35)	29.5" × 44.3"	18.9" × 28.3"	16.8" × 25.2"	12.6" × 18.9"

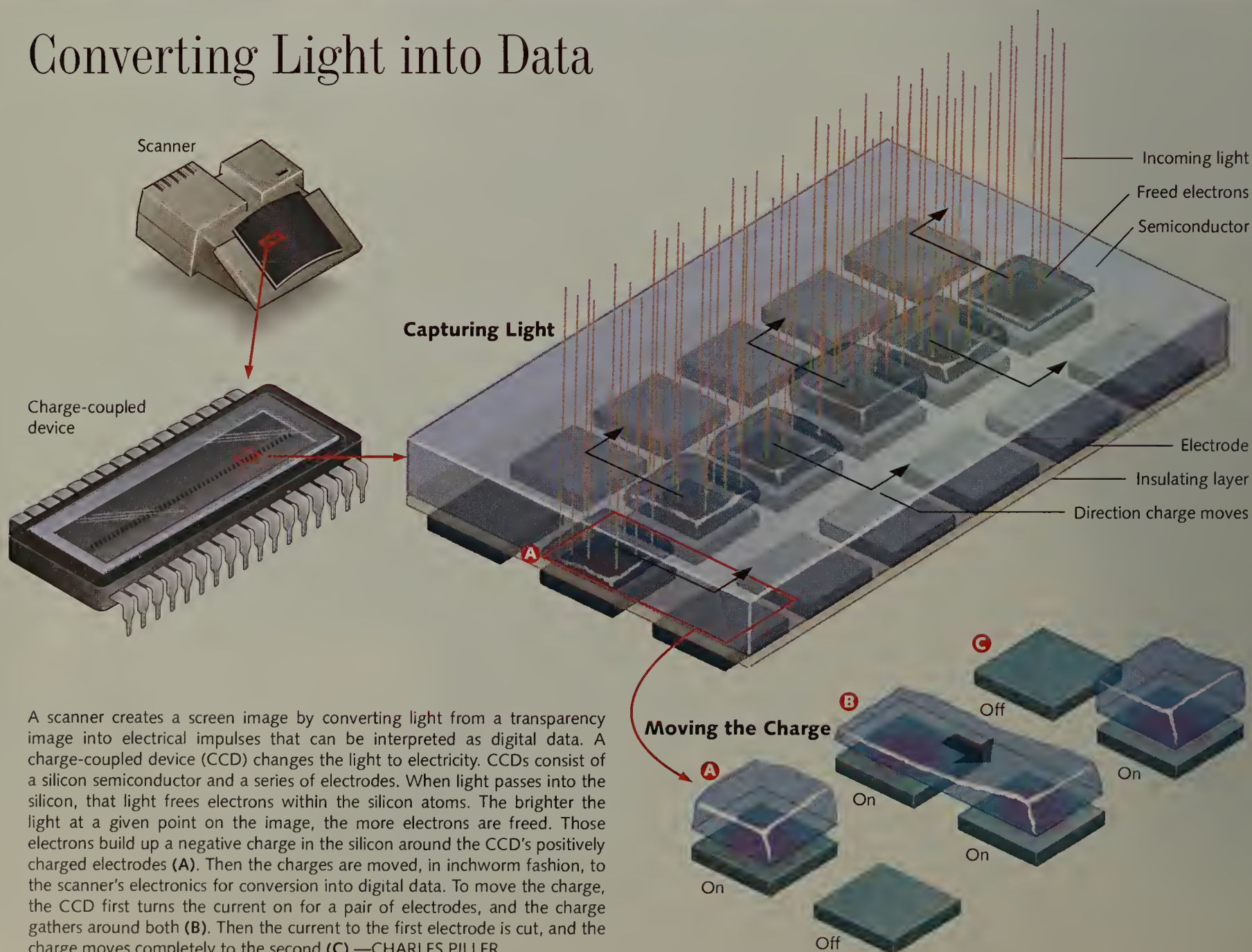
Why buy a high-priced, high-resolution scanner? The most common reason is a desire to print at larger sizes and finer line screens. This table shows maximum output dimensions of 35mm slides scanned on various machines and printed at typical line screens. For output resolution, *effective* refers to the resolution achieved after a scan has been enlarged (enlarging reduces resolution, since image samples are spread over a larger area). *Ratio* refers to the relationship between scan resolution and halftone linescreen. A ratio of 1:1 is the minimum; 1.5:1 provides good image sharpness; 2:1 provides maximum sharpness.

Scanners achieve tone corrections in three basic ways. Two ways make a difference in getting the best possible scan. The third is irrelevant—but it's the cheapest and easiest to implement, and therefore the most commonly found.

The method that doesn't make a dif-

ference I call *8-bit processing*. In 8-bit processing, a scanner simply takes 8 bits of data per color channel from the device within the scanner that converts analog light signals to digital information. It then runs the data through a software lookup table that adjusts the values—for example,

Converting Light into Data



A scanner creates a screen image by converting light from a transparency image into electrical impulses that can be interpreted as digital data. A charge-coupled device (CCD) changes the light to electricity. CCDs consist of a silicon semiconductor and a series of electrodes. When light passes into the silicon, that light frees electrons within the silicon atoms. The brighter the light at a given point on the image, the more electrons are freed. Those electrons build up a negative charge in the silicon around the CCD's positively charged electrodes (A). Then the charges are moved, in inchworm fashion, to the scanner's electronics for conversion into digital data. To move the charge, the CCD first turns the current on for a pair of electrodes, and the charge gathers around both (B). Then the current to the first electrode is cut, and the charge moves completely to the second (C).—CHARLES PILLER

SAVE
\$27~~45~~
off the
cover
price

12 Issues for \$19.95

Subscribe today

☐ Send me 1 year/12 monthly issues of MACWORLD for \$19.95 plus a FREE "Educorp" disk. Save nearly 33% off the basic subscription rate.

☐ SAVE EVEN MORE! 2 years/24 monthly issues for \$37.90 plus a FREE "Educorp" disk. Please bill me later. State and county sales tax will be added where applicable.

Name _____

Company _____

Address _____

City/State/Zip _____

Receive a FREE GIFT!



Includes
Money Matters
for maximizing your personal
finances, *Project Leader*, and fun
games like *Spacestation Pheta*,
Glider, *Klondike*, and lots more!

4B7M7

MACWORLD

The Macintosh® Magazine

**SAVE
58%**

**SEE
BACK**



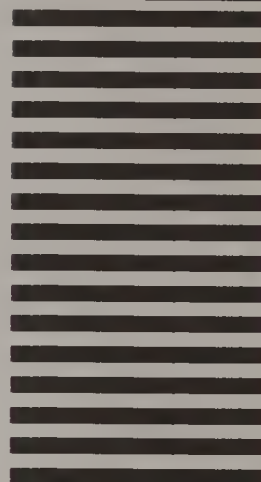
NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1167 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

Macworld
Subscription Department
P.O. Box 51666
Boulder, CO 80321-1666



enhancing brightness—according to your instructions. While this technique can make a scan look better, it can't buy you any new information about the image. You're simply optimizing the appearance of the 256 values you've already collected.

Eight-bit processing is the type of processing Adobe Photoshop and most other Mac image editors perform—which is exactly why it's irrelevant to scan quality. In most cases where 8-bit processing is the only option, it's easier to just make post-scan corrections in Photoshop, where you have more control over the results.

The other two tone-correction methods actually bring new information—and therefore new image detail—into the scan. One method involves adjustments made before the data hits the analog-to-digital converter. To brighten a scan, for example, many scanners simply crank up the light source or increase exposure time. Another common technique is to reset the sensitivity of the analog-to-digital converter by changing its *reference voltages*—the electric charge values it interprets as black and white.

The Nikon LS-3510AF Film Scanner passes the charges through circuitry that boosts or dampens their strength, effectively causing the scanner to read the charges as brighter or darker light impulses. While hardware tone corrections make more meaningful changes than does 8-bit processing, the level of control they offer typically isn't as precise as that provided by digital image processing. Relatively precise analog methods, like the Nikon's, are expensive to implement.

The third adjustment strategy involves simply collecting more than 24 bits of data. For example, instead of 256 shades per color channel, the LeafScan 35 captures more than 65,000 values (16 bits per channel). With all that extra input, you can sift, sort, and select quite a bit yet still deliver a full complement of 256 (optimized) values to the Mac when you save the file.

Collecting more than 8 bits per channel also helps to get around the electronic *noise* problem that afflicts all the scanners in this article. Scanner noise is inaccurate data caused by interference from a variety of physical and electronic sources. The more data the scanner collects, the less significant the noise is as a percentage of the total information available, and the fewer errors noise causes. (Noise usually forms streaks or random tone variations in dark areas of an image.)

Tone Controls: Software

HARDWARE CAPABILITIES CREATE THE potential for meaningful tone adjustment, but software gives you the tools for work-

ing your will on an image. The most critical controls are those that enable you to match the tones the scanner captures with the brightness range of an image. The clumsy way to do this is through brightness and contrast settings.

Imagine a scanner as a net that you cast out over a stream of fish representing brightness values. The net can hold only 256 fish, and you're trying to catch a particular school. Brightness adjustments control how far up- or downstream you throw the net, while contrast settings determine how broadly or narrowly you cast. Obviously, catching the fish you want—those fish and no others—requires both controls.

Actually, using brightness and contrast to control the range of a scan is just about as precise as the fishing simile suggests. The process usually involves scanning, measuring the scan in Photoshop, adjusting one or both settings, and then rescanning—over and over.

The better scanners use more-elegant approaches to solving this problem. The Nikon and Leaf automatically analyze the prescan and make a stab at an automatic adjustment. For those who want more control, the Set Highlight tool in Barneyscan's CIS 3515, Leaf Systems' LeafScan 35, and Imapro's QCS-600, and the Set Shadow tool in the Leaf machine let you click on areas of the prescan to identify which parts of the image the scanner will assign to values 256 (highlight) and 0 (shadow). Other scanners can crop the prescan so that only a limited area is considered in the scanner's automatic range calculations, which achieves almost the same purpose.

The Leaf and Imapro units, as well as the Sharp JX-600S and the Umax UC-1200S, offer a further level of tone control. Once you've staked down your highlight and shadow points, it's often desirable to adjust the distribution of tones between those poles. Entering a new *gamma* number enables you to assign a disproportionate number of the 256 shades at your disposal to, say, the mid-tones of an image, thus sharpening details in that part of the slide.



Good, Better, Out of Our Price Range

Scans by an \$80,000 Scitex SmartTwo (top), the Nikon LS-3510AF (middle) and the Barneyscan CIS 3515 (bottom). The CIS 3515 gives very nice color, but showed marked noise problems in some scans. Also, notice the variations in shadow detail in the Asian woman's hair.

Even more advanced is the ability to create custom tone curves that let you re-assign values in the highlight, midtone, and shadow areas individually. At this writing, only the LeafScan 35 offers this capability. By the time you read this, new software for the Nikon scanner should give tone-curve control to those with the 12-bit option installed.

You should be aware that while many of the scanners in this review *appear* to have a complete set of the tone tools just discussed, it's not uncommon for scan programs to mix controls that invoke 8-bit processing with other, more meaningful types of adjustment. "Slide Scanners at a Glance" lists only those tools that we determined make changes you couldn't make in Photoshop.

"Slide Scanners at a Glance" also includes a number of software features that are useful but do not directly relate to a scanner's ability to produce top-quality scans. This list provides an index

of the care that went into producing a scanner package.

A few items require a word of clarification: "Calculate Output Size and Resolution" refers to a program's ability to tell you what a scan's final, effective resolution and dimensions will be once the image has been enlarged by the amount chosen. "Maintain Prescan between Scans" refers to an ability that's an essential in my book. Without it, every time you need to rescan an image for whatever reason, you also have to re-create the prescan.

"Magnify Prescan" is the ability to zoom in on the prescan. This feature can save quite a bit of rescanning time by

keeping you from missing your intended subject when you are cropping a tiny, 35mm prescan.

Recommendations: Flatbeds

THE GOOD AND SOMEWHAT SURPRISING news about flatbed scanners is that it's possible to use them for color publishing—which is great if you need the flexibility flatbeds afford. The bad news is that if you want a flatbed that has the ability to do prepress work, it'll set you back at least 14 grand.

Unless you always print at low resolutions or small sizes—or from large transparencies—and you are not very

SLIDE SCANNERS AT A GLANCE

Company	Tested by Macworld Lab	Model	Price	Price Transparency Option	Bundled Image Editing Software	Bits per Channel	Optical Resolution (in dpi)	Maximum Scan Area, Transparency	Maximum Scan Area, Reflective	Warranty (in days)	Technical- Support Rating ¹
35mm											
Barneyscan Corporation	●	CIS 3515	\$4495	NA	Photoshop Ltd. Edition	8	1000	35mm	NA	90	10
Ektron Applied Imaging	○	Slide Scanner	\$11,190 (with required GPIB board)	NA	none	12	2800	36mm × 24mm	NA	90	not tested
Leaf Systems	●	LeafScan 35	\$9995	NA	none	16	4000	38.1mm	NA	90	11
Microtek	●	ScanMaker 1850S	\$2199	NA	Photoshop	8	1850	35mm	NA	365	12
Nikon	●	LS-3510AF Film Scanner	\$9535 (8-bit) ⁵ \$11,316 (12-bit)	NA	Photoshop or ColorStudio 1.5	8 and 12	3175	40mm	NA	365	dealer support primary
RasterOps Corporation	●	Espresso Personal Slide Scanner	\$849 (without required video capture board)	NA	none	NA	variable	35mm	NA	1095	7
Santos Technology	○	Mira 35	\$2695	NA	Photoshop	10	2700	35mm × 24mm	NA	365	not tested
Victor Hasselblad	○	Hasselblad Macsie 35A	\$12,995 (with required GPIB board)	NA	Cirrus	12	2200	36mm × 24mm	NA	183	not tested
FLATBED											
Agfa Corporation	○	Arcus	\$3950	\$1000	none	10	600 × 1200	6" × 9"	8" × 11.75"	365	not tested
	○	Agfa Focus Slide Scanner	\$6995	\$1500	none	8	400 × 800	5" × 5"	8.5" × 13"	90	not tested
Computer Friends	○	Artiscan AS8000 ⁷	\$1445	\$699	Photoshop	8	800	8.5" × 11.75"	8.5" × 11.75"	365	not tested
Hardware That Fits	○	RealTech Scan 800	\$1299	\$495	ColorShop 24, ScanMatch, Photo- shop \$200 extra	8	400 × 800	8.5" × 11.75"	8.5" × 11.75"	365	not tested
HSD Microcomputer U.S. A.	○	Scan-X Color ⁸	\$1495	\$695	Photoshop	8	600 × 300	6" × 9"	8.5" × 14"	365	not tested
Imapro Corporation	●	QCS-600	\$16,395 (with re- quired GPIB board)	included	none	10	600	11" × 17"	11" × 17"	90	13
Mitsubishi International	○	SC-7500	\$5500	\$949	Photoshop	8	400	11" × 11"	11" × 17"	90	not tested
Nisca	●	Niscan Spectra	\$995	requires light table	none	8	200 × 400	4" × 6"	4" × 6"	365	8
Sharp Electronics Corporation	●	JX-320	\$1895 ¹⁰	\$1195	Photoshop	8	300 × 600	8.5" × 10.5"	8.5" × 11"	90	-5
	○	JX-450	\$5995 (with re- quired GPIB board)	\$500	Photoshop	8	300	8.5" × 11"	11" × 17"	90	-5
	●	JX-600S	\$14,500	included	Photoshop	10	600 × 1200	11" × 17"	11" × 17"	90	-5
Tamarack/Artix Technologies	●	ArtiScan 6000C	\$1295	\$695	Photoshop	8	300 × 600	8.5" × 11.75"	8.5" × 11.75"	365	7
Umax Technologies	●	UC630 Color Scanner	\$1995	\$895	Photoshop	8	300 × 600	6" × 9"	8.5" × 14"	365	6
	●	UC1200S	\$5495	\$895	Photoshop	10	1200 × 600	6" × 9"	8.5" × 11.75"	365	6
XRS	●	OmniMedia 6cx	\$4000 ¹²	included	Photoshop ScanMatch	8	300 × 600	8.5" × 13.5"	8.5" × 13.5"	365	4

● = yes; ○ = no. ¹ 12-14 = excellent, 9-11 = very good, 7-8 = good, 5-6 = satisfactory, 1-4 = poor, <1 = unsatisfactory. ² For tested scanners, credit given for exposure and other tonal adjustments only if controls affect analog data or lookup tables of greater than 8 bits. ³ Highlight only. ⁴ To avoid confusion over differences in definitions between companies, features listed only for scanners tested. ⁵ 12-bit board as an upgrade is \$1780. ⁶ 12-bit version. ⁷ AS6000, with 600-by-600-dpi resolution available for \$1699. ⁸ Scan-X Grayscale available for \$1295.

fussy about quality, the only models I can recommend are the Imapro QCS-600 and the Sharp JX-600S. Both units are based on the same design, by Sharp, and both provide high-quality separations.

Of course, quality isn't everything. Both machines are large, slow, and awkward to use, and they don't carry adequate warranties. And both provide only the minimum resolution for 35mm.

If I had to pick, I'd probably go for the Imapro, which has some added processing circuitry that eliminates the streaking the JX-600S is prone to. In addition, the Imapro software helps you get the right exposure, instead of dooming you to trial

and error as the JX-600S's extremely basic package does. And Sharp's tech-support line is so busy as to be virtually worthless, while Imapro was accessible and helpful. On the other hand, the JX-600S is nearly \$2000 cheaper than the Imapro and offers a higher resolution.

If you want a flatbed-and-slide scanner for less demanding jobs such as producing mock-ups or on-screen presentations, you have two choices: the ArtiScan 6000C and the Sharp JX-320. Both machines can produce good-looking scans larger than an Apple 13-inch monitor, in under 30 seconds. Scans from the JX-320 are noticeably sharper, but the Arti-

Scan lists for \$600 less and comes with a one-year warranty instead of the 90 days covered by Sharp.

A new machine, the Agfa Arcus Color Scanner, should have a transparency option by the time you read this. The Arcus has similar hardware features to the Umax UC1200S but, including the transparency attachment, it beats the UC1200S's price by \$1440. From what I've seen, it also comes with much more useful software than the Umax's.

If you need to scan 8½-by-14-inch items, don't be tempted by either the XRS OmniMedia 6cx or the Umax UC630 Color Scanner. Both were among the poor-

Interface	Photoshop Plug-In Version	Color/ B&W/ Gray Scale	Magnify Prescan	Calculate Output Size and Resolution	Save Settings by Name	Maintain Prescan between Scans	Set Brightness ²	Set Contrast ²	Automatic Highlight and Shadow ²	Set Highlight/ Shadow ²	Set Gamma ²	Tone Curve Control ²	Densitometer (for prescan)
proprietary	2.6	●/○/●	○	●	○	○	●	○	● ³	●/○	○	○	●
GPIB	not tested ⁴												
SCSI or GPIB	1	●/○/●	○	●	○	○	●	●	●	●/●	●	●	●
SCSI	2.0.1	●/●/●	●	●	●	●	●	●	○	○/○	○	○	●
SCSI or GPIB	3.1.2	●/●/●	●	●	○	●	●	●	●	○/○	● ⁶	○	●
NTSC or PAL	1.3	●/●/●	●	○	○	○	●	○	○	○/○	○	○	○
SCSI	not tested ⁴												
GPIB	not tested ⁴												
SCSI	not tested ⁴												
SCSI	not tested ⁴												
SCSI	not tested ⁴												
SCSI	not tested ⁴												
SCSI	not tested ⁴												
GPIB	2.0.1	●/●/●	○ ⁹	○	○	●	●	○	○	●/○	●	○	●
SCSI or GPIB	not tested ⁴												
Serial	1.5	●/●/●	●	○	○	●	○	○	○	○/○	○	○	○
SCSI or GPIB	1.3	●/●/●	○	○	○	●	●	○	○	○/○	○	○	○
GPIB	not tested ⁴												
SCSI or GPIB	1.3	●/●/●	○	○	○	●	●	○	○	○/○	●	○	○
SCSI	1	●/●/●	○	○	○	○	●	○	○	○/○	○	○	○
SCSI	2.0.1	●/●/●	○	○	○	●	●	●	○	○/○	○	○	○
SCSI	2	●/●/●	○	●	○	●	●	● ¹¹	○	○/○	●	○	○
SCSI	2.0.1 (tested) ¹³	●/●/●	●	●	●	●	●	●	○	○/○	○	○	●

⁹ Prescan is quite large, however. ¹⁰ \$1345 without Photoshop. ¹¹ Exists, but not useful. ¹² Upgrade from Microtek scanner \$2000. Model 6C is \$3000, \$1500 for upgrade. ¹³ Software recently upgraded to version 2.1.1, but not tested.



Scanner Speed

Times are in seconds;
shorter bars are better.

35mm Scanners

Barneyscan CIS 3515
Leaf LeafScan 35
Microtek ScanMaker 1850S
Nikon LS-3510AF/12 (fast)
Nikon LS-3510AF/12 (high quality)
Nikon LS-3510AF/8 (fast)
Nikon LS-3510AF/8 (high quality)

Gray-Scale Prescan

19
NA
45
61
61
61
61

Color Prescan

NA
105
115
89
89
95
95

Final Scan

98
271
234
98
163
101
175

Flatbed Scanners

Imapro QCS-600
Nisca Niscan Spectra
Sharp JX-320 (fast)
Sharp JX-320 (high quality)
Sharp JX-600S (fast)
Sharp JX-600S (high quality)
Tamarack/Artix ArtiScan 6000C
Umax UC630 Color Scanner
Umax UC1200S
XRS OmniMedia 6cx (fast)
XRS OmniMedia 6cx (high quality)

NA
NA
17
17
25
24
23
22
11
26
25

150
88
NA
NA
NA
NA
NA
NA
NA
75
76

134
109
28
36
49
84
36
70
24
43
61

A 35mm color slide was scanned for all tests. Flatbed resolution was 300 dpi; 35mm scanners were tested at 1000 dpi. The test computer was a Mac IIci with an Apple cache card and 8MB of RAM. Some scanners operate faster in either landscape or portrait mode; all times are for the faster orientation.

est performers in our color-response tests. The XRS—basically a Microtek 600ZS with a transparency attachment added—is blurry and extremely noisy, which leads to very bad shadow-detail discrimination.

Recommendations: 35mm

IN THE 35MM ARENA, ONCE AGAIN the only options for the prepress set are expensive. Both Leaf and Nikon offer capable machines and include polished software modules that help you to get excellent results. The units do have their respective strengths and weaknesses, however.

The main point in the Nikon LS-3510AF Film Scanner's favor is that it was better able to resolve small detail in our tests, despite the Leaf's higher resolution rating. The problem here seems to be the Leaf's fixed-focus design; the scanner is focused at the factory, where an assumption is made about the thickness of the slide holders you'll use. The Nikon focuses automatically during prescan.

Our experience also showed the Nikon to be the more reliable machine. We had to get Leaf to ship us three different LeafScan 35's into the lab before we found one that didn't have some kind of problem. This might just have been bad luck, but it casts the Leaf's 90-day warranty in a worrisome light.

The LeafScan's edge is that it has a higher bit depth than its direct price competitor, the Nikon with an 8-bit option. This gives the LeafScan more dynamic range, and it gives experienced users who know their way around a gamma curve more tonal control than they would have with the Nikon.

The 12-bit option for the Nikon, which you install as a plug-in board, should give the LS-3510AF capabilities similar to the LeafScan's—albeit at a higher price. When this was written, the Nikon software driver wasn't able to effectively access the 12-bit data, so we weren't able to test the upgrade.

If you need a less expensive 35mm scanner, your choices are a mixed bag. The Barneyscan CIS 3515 produces far better color than does the Microtek ScanMaker 1850S, and the BarneyScan software is much more useful. On the other hand, the Microtek sells for less than half the price and offers almost twice the resolution. Both scanners have problems holding shadow detail, but either one will provide better quality than a low-price flatbed. The mira 35, from Santos Technology, is the first inexpensive 10-bit Mac scanner. It offers a resolution of 2700 dpi and has a projected price of \$2695. It began shipping after our test deadline.

By the time you read this, another new medium-price 35mm scanner should be available. An upgrade to Eastman Kodak's Rapid Film Scanner, the RFS 2035, is a 10-bit, 2100-dpi device that will sell for \$7995.

Two other units not covered in this article will be of interest to people who want to scan transparencies up to 4 by 5 inches in size. Microtek should be selling its new 12-bit 45T by the time you read this; at press time, the company had not announced a price. And Leaf has announced that it will be holding a closeout sale on the current implementation of its Leaf 45 before bringing in a new version. The scanner, which usually sells for \$22,995, will go for \$14,900.

Scanning on the Cheap

MY BASIC ADVICE ABOUT THE RASTER-Ops Espresso Personal Slide Scanner and the Niscan Spectra: don't bother. Even for

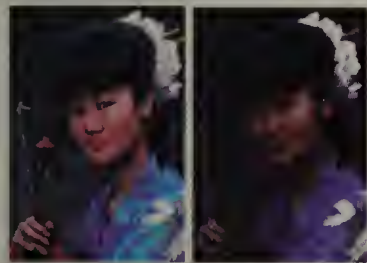
The Good and the Mediocre Scans by the Imapro QCS-600 (facing page, right) and Tamarack/Artix ArtiScan (facing page, left) give an idea of the quality flatbeds are capable of. Compare the sharpness of the Imapro versus that of the Tamarack/Artix to appreciate the difference between the Imapro's true 600-dpi and the Tamarack/Artix's 300-by-600-dpi files.

Dynamic Range and Saturation

Good and poor dynamic range.

LeafScan 35

OmniMedia 6cx



Dynamic Range

This test measures a scanner's ability to detect subtle differences in brightness at the extreme ends of the tonal scale—100 is black, 0 is white. This is important, because highlight and shadow detail are what give an image the illusion of three-dimensionality.

Saturation

This test rates scanners by how efficiently they separate the color spectrum into the three primary colors red, green, and blue. A small amount of "crosstalk" between color channels can be desirable. But for our purposes, the lower the number, the better the scanner's ability to distinguish among colors.

35mm Scanners

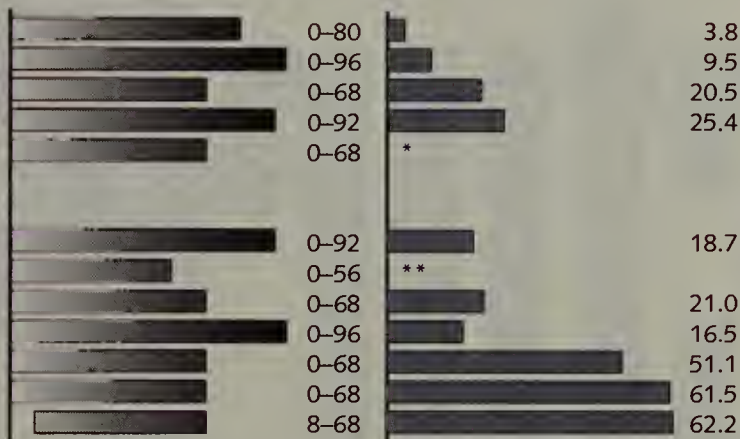
Barneyscan CIS 3515
Leaf LeafScan 35
Microtek ScanMaker 1850S
Nikon LS-3510AF (8- and 12-bit)
RasterOps Espresso

Flatbed Scanners

Imapro QCS-600
Nisca Niscan Spectra
Sharp JX-320
Sharp JX-600S
Tamarack/Artix ArtiScan 6000C
Umax UC630 Color Scanner
XRS OmniMedia 6cx

Longer bars are better.

Shorter bars are better.



* Video scanner; saturation test not applicable. ** Scanner can produce corrected scans only.

on-screen display, these units offer questionable quality.

To be fair, the RasterOps—actually a video camera mounted permanently above a lighted stage—is fast and easy to use. If convenience is your main consideration and you already have a display board with video-digitizing capability, the Espresso is an inexpensive option. But Espresso scans are useful only for purposes of representation, not presentation.

The Niscan works like a miniature flatbed; to use it with slides you have to set it on top of a light table. This machine

simply doesn't have the resolution for 35mm, and for larger media its deathly slowness is a real problem. In a spot test it took the Niscan almost 20 minutes to scan a 4-by-5-inch transparency.

In the end, with the exception of the Leaf and the Nikon, it's hard to get excited about any of the units we tested. Your money definitely buys more scanner today than it did two years ago, but all these machines have notable shortcomings. The new generation of scanners just coming to market looks promising; features keep getting better while prices fall.

MW

EDITORS' CHOICE

LS-3510AF Film Scanner

Autofocus design offers maximum sharpness with minimum hassle. The Nikon's sophisticated analog hardware adjustments mean that even the 8-bit machine provides good dynamic range. **Company:** Nikon. **List price:** \$9535 for 8-bit option; \$11,316 for 12-bit unit.

LeafScan 35

Fixed-focus design and resulting sharpness problems are offset by superior tonal control and dynamic range. The Leaf yielded the best-looking color in test separations. **Company:** Leaf Systems. **List price:** \$9995.

For some users, however, the best way to meet their scanning needs may be to buy a CD ROM player. Kodak's Photo CD program, which should be up and running by the time you read this, promises high-quality 35mm scans at about a dollar apiece (see "CD ROM Drives: Into the Mainstream," in this issue).

If you decide to buy your own device, remember that using a scanner is a lot like using a camera. You can always operate in automatic mode, but getting professional-looking pictures requires know-how and practice. If you're really interested in quality imaging, your efforts at learning about how scanners work won't end when you've finished this article. **m**

See *Where to Buy* for contact information.

Contributing editor JOE MATAZZONI writes about desktop publishing and multimedia. He lives in Oakland, California.

Macworld Lab testing supervised by MARK HURLLOW.



WHAT'S WRONG WITH THIS

Picture?

HOW
TO PRESENT
DATA
ACCURATELY—
AND
ATTRACTIVELY

BY CHARLES SEITER

Human eyes are superb at locating edges and color in images, and at estimating sizes of objects in a view with known perspective. For our first half million years, these functions were necessary for survival. But our eyes are not particularly good at deciphering a mass of text with a quick glance and yet a table of numbers is usually the most accurate representation of business and scientific data.

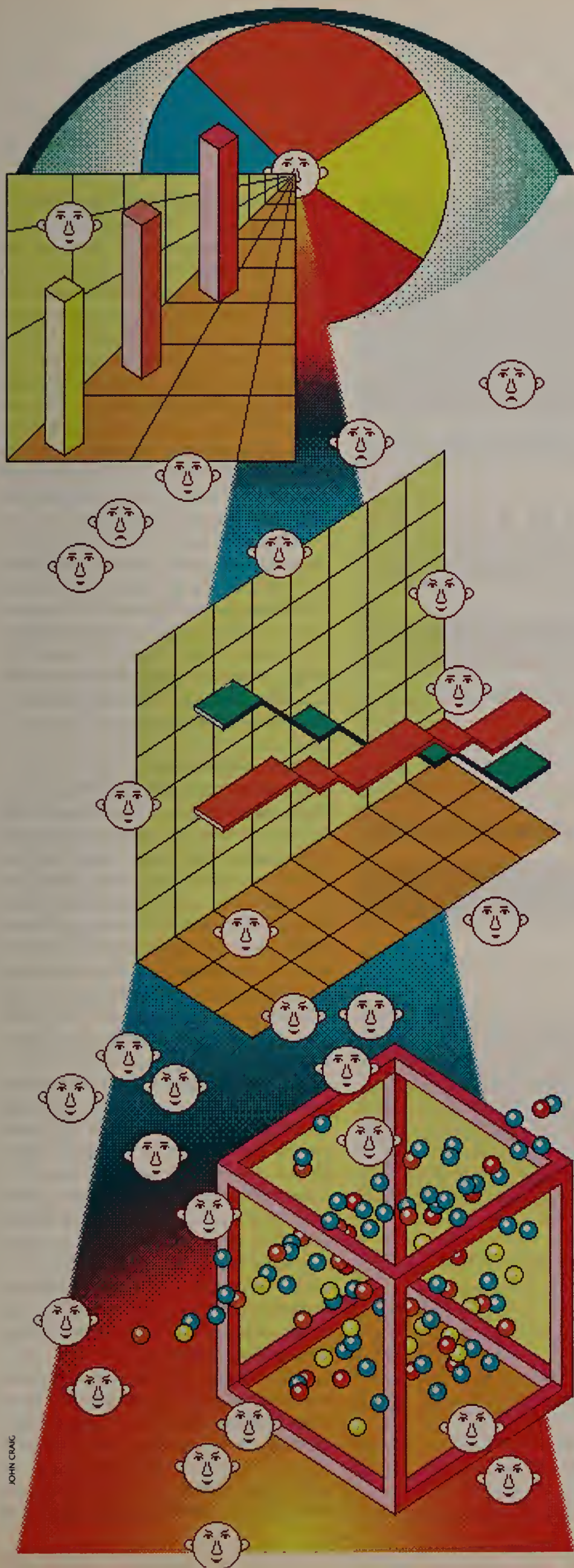
Thus, if you can translate a table of numbers into a picture, people will perceive your data much more easily. But if you're not careful about presentation—particularly in matters of perspective and scale—a picture can be remarkably misleading. It's easy with gee-whiz features in today's presentation, graphics, and publishing software to obscure or even alter the data's real

message by using the wrong effects or by using the right ones incorrectly.

The best software for translating numbers into pictures runs on the Mac, but you may find little documented guidance for the actual process of translation. This article presents a gallery of data-representation examples.

Distortion from Special Effects

Consider the first graphic in "Distorted Data." It was drawn in DeltaGraph Professional, one of the most capable and easiest-to-use graphing programs. DeltaGraph takes advantage of 3-D presentation features that are only partially implemented in the newest spreadsheets. The graphic makes a dramatic conference-room slide. It's also a fairly misleading picture of the underlying numbers.

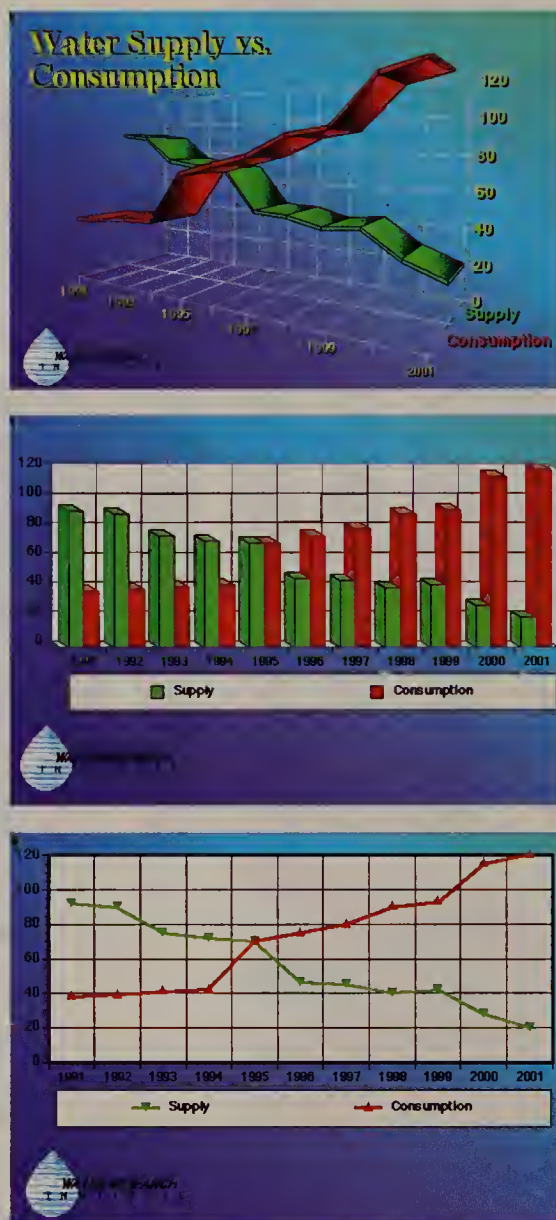


This ribbon chart has two problems. You cannot simply look at the picture and decipher, point by point, the original numbers underlying the table—you can do this more easily with a simple line chart. The second problem is that the viewing angle de-emphasizes the last numbers in the series. By inadvertently rotating the “glass brick”—the 3-D grid in which the ribbons float—you can make the ribbons appear to zoom away from each other (if viewed from the right corner) or nearly converge (if viewed on a slant from the chart’s origin).

The same data would also be distorted, although perhaps not to the same extent, by the familiar 3-D bar chart format offered in most business graphics packages. It turns out that, in this case, the least-imaginative graphic, the line chart (also shown in “Distorted Data”), gives the least-biased representation of the original numbers.

As luck would have it, several other ways to make plain numbers into exciting graphics are also fraught with problems. For example, suppose you want to represent the net worth of executives as a row of money bags, as *Macworld* did in its February 1992 article “Year in Review” (reproduced here as “Overstating the Case”). If you make the bag for Microsoft’s Bill

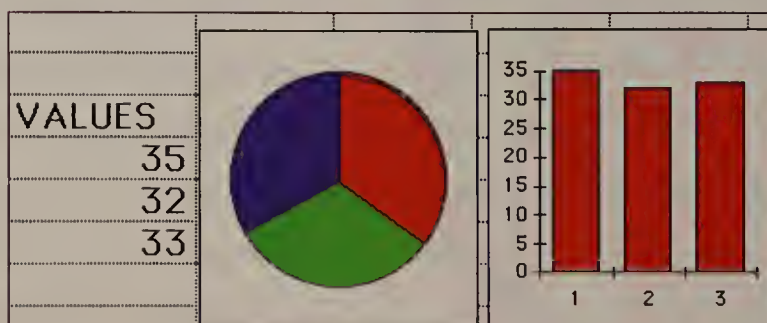
Distorted Data The dramatic presentation-quality ribbon chart (top) makes a 3-D graphic out of data that's really only two-dimensional, making an accurate reading more difficult. A bar chart's straight-on perspective (middle) eliminates the confusion introduced by the ribbon charts's skewed perspective, but the alternating bars make it hard to follow the data's trend. The much plainer line chart (bottom) presents the same data in a way that lets you reconstruct the underlying numbers easily by eye.



Overstating the Case When using basic shapes to show differences in scale, it's typical—but wrong—to double the size both vertically and horizontally to show that something is twice as big as something else. But doubling along both axes makes the difference 4 to 1 rather than 2 to 1. *Macworld* made just this mistake in an earlier issue's graphics.



True Differences For regular objects, such as triangles and bars, people can see small changes in edges better than they can see small changes in area—it's far easier to pick out differences in this data looking at the bars. By the way, if you need to present numerical data to cats, always use bars. Cats basically just see edges, according to recent research.



Gates, who is worth \$4.8 billion, twice as big as the bag for Microsoft's cofounder Paul Allen, who is worth \$2.3 billion, you will show a symbol with *four* times the area of the single worth unit (as was done in "Year in Review"). If, more accurately, you use a bag for Gates twice as high as the bag for Allen, you find that you can't represent much range without ridiculous distortion of the symbol. If you make Gates's bag have twice the area, it won't appear to be twice as big, since people are better at estimating size differences of regular objects along one dimension than along two or more dimensions.

Does this mean that all attempts to liven up a presentation result in distortion? Not necessarily, but it means that the effects of filtering our new reams of data through our old Stone Age visual system need to be considered carefully. Properly applied, graph elements, space, and color *can* make data representation both interesting and accurate.

A Table of Elements

VIRTUALLY ALL PROGRAMS THAT HANDLE numbers let you make up pie charts, bar charts, and line charts. So when do you choose one type of chart over another? Consider the data table and associated Microsoft Excel 3.0 charts in "True Differences." That image demonstrates how hard it is to pick out small differences in angles but how easy it is to pick out small differences in bar height when the bars are adjacent. Pie charts work well to show relative, gross differences. For example, in "True Differences," the pie chart shows that the three pieces of data are roughly equal. Bar charts work well to show slight differences among similar data, as the figure shows. Which you pick depends on what you want to emphasize. Bar charts also work better when you have many small quantities, since small quantities can get lost in a series of small pie slivers; in a bar chart, each bar has the same weight along one dimension, and the small data are readily apparent in the other dimension by their obvious lack of presence.

There are, in statistics programs, more-exotic ways to represent any set of data. Because people are very good at picking out differences in the areas of irregular objects, advanced statistics programs give you the option of displaying quantities as "blobs"—stars, sunflowers,

PROPERLY APPLIED, MODERN TOOLS CAN MAKE DATA REPRESENTATION BOTH INTERESTING AND ACCURATE

and other symbols that provide you with several outside edges.

An even more imaginative use of graphic elements was introduced by the American statistician H. Chernoff in the 1970s. Not only is a person's visual system good at discriminating certain kinds of small differences in objects, but it's really impressive at evaluating facial expressions—you can probably detect a slight frown from three blocks away. "How Did You Do?" shows a sales data set represented by SYSTAT 5.2 in this whimsical but surprisingly useful mode. The faces are most useful for large data sets; it is possible to devise a ratings scheme in which people can pick out the "happiest" face (using ratings of several variables) from a set of nearly 100 faces printed in a small area.

Scattered in Space

LOOK AT THE DATA IN THE TABLE IN "Scattered Scatterplots" and then look at the standard spreadsheet scatterplots. This is an exceptionally clear example, formulated by F. J. Anscombe, in which the tabular data shows you almost nothing—the statistics for the two data sets are nearly identical—but simple scatterplots make the underlying trends in the two data sets absolutely clear.

The scatterplot is the preferred vehicle for scientific exposition (you can find scholarly journals in which it is the only type of graphic displayed throughout an issue) because it's intrinsically nondistorting and can handle lots of data. Where pie charts start to get cluttered at 6 values and bar charts look like cityscapes beyond 15 categories, several hundred points can fit on a scatterplot with no visual problems.

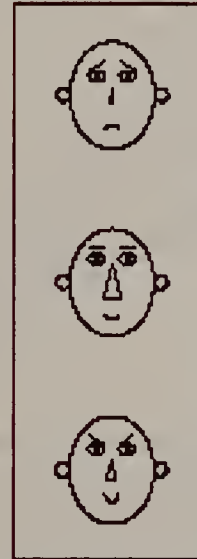
The standard scatterplot is good for two-dimensional (x -by- y) cases, like housing starts per county versus county family income, or weight at age 40 versus lifetime doughnut consumption. For data comparing more possibly related variables—different types of crime, for example—another representation is needed. That's why the graphics in "Scattered Scatterplots" wouldn't work for such kinds of relationships. The trick for extending the usefulness of the scatterplot is to find a way to represent higher-dimensional spaces.

The first space-expanding technique developed for this situation was the

scatterplot matrix. The principle is simple, as shown in the SYSTAT 5.2 scatterplot matrix in "Correlating Crimes." If you have four crime variables to inspect, you make up scatterplots of each set of pairs of variables and arrange them in a grid. You can then view the set of scatterplots, looking for cases where the data clusters along a line or curve.

The scatterplot matrix exploits two strengths of the scatterplot. First, a scatterplot can be reduced to a fairly tiny scale and still give the same information on quick inspection. Second, even a black-and-white dot matrix printer can do a respectable job of hard-copy production (the method appeared in early statistical computing on mainframes in the 1960s). As a technique to help you in a blind search for some sort of connection in a group of variables, it's hard to beat.

But now that computer displays have progressed from monochrome character-based output to movielike 3-D, there's another method that's a sort of scatterplot on steroids—the rotating 3-D scatterplot. In this technique, you select three variables at a time from your data table, and the Mac creates a plot of points inside a



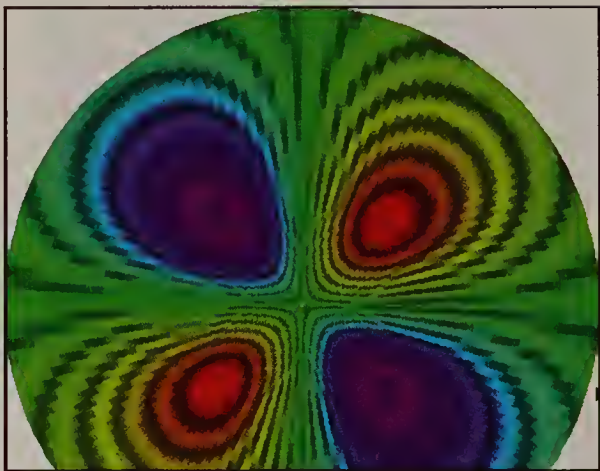
How Did You Do? In this picture, facial expression (eyebrow angle and smile) represents one set of numbers, and the nose size another. It's easy to pick out extreme values from even a huge array of tiny faces.

Data-Representation Software Picks

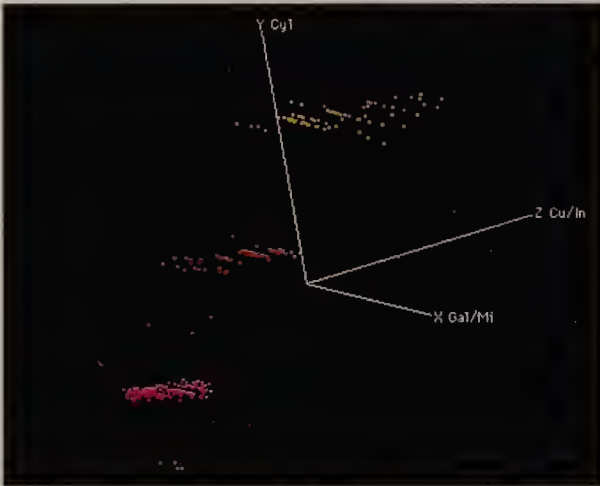
There is no shortage of Mac products designed to enhance the graphical display of data. Among the better ones are the following.

- **Presentation packages** Although their flashier chart types should be used with caution, many presentation packages offer effects that will wake up a figure-weary audience. DeltaPoint's \$295 DeltaGraph Professional and Bravo Technologies' \$199 MacGraphX are notable for a variety of graphs and charting control, while Aldus's \$495 Persuasion, Microsoft's \$395 PowerPoint, and Computer Associates' \$199 CA-Cricket Presents are leaders at producing charts as slides and overheads.
- **Exploratory charting** The giant \$895 program SYSTAT 5.2, from SYSTAT, includes nearly every data representation ever developed, right down to QuickTime movies of scatterplots. Other programs with strong exploratory-data charting are Data Description's \$595 Data Desk and SAS Institute's \$695 JMP. Still the champion at 3-D visualization is Abacus Concepts' \$295 MacSpin.
- **Scientific analysis** The leading color 3-D visualization system for the Mac is a suite of three programs—the \$495 Transform, \$195 Format, and \$495 Dicer—from Spyglass. For visualizing computational data, the \$399.95 symbolic math program Theorist, from Prescience Corporation, is probably easiest for beginners to use, while Wolfram Research's \$595 Mathematica (\$895 for the coprocessor version) offers more scope at the cost of a steeper learning curve. Later this year, the powerful numerical computation package MATLAB from The MathWorks is expected to add to the Mac version (currently \$795) the impressive color 3-D graphing capabilities now available in its \$2995 Unix workstation version.

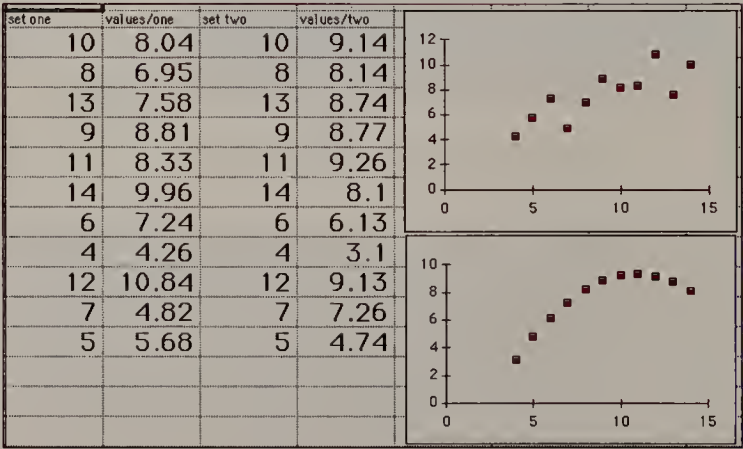
In Orbit Because color scales can represent arbitrary quantities, they can represent things that can't be seen or felt. This plot shows electron density in an atom's orbital shell.



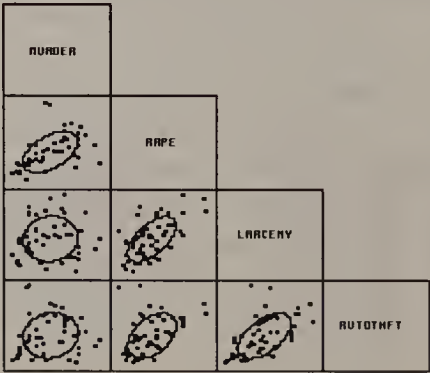
Seeking a Relationship in a Data Stack This 3-D plot relating automobile gas mileage to engine displacement and number of cylinders is another type of spatially expanded scatterplot. With appropriate color coding (here yellow indicates the large engines and red indicates small engines), a rotatable 3-D plot is the most powerful tool for visualizing data.



Scattered Scatterplots The two data sets shown here are characterized by the same statistics (mean, standard deviation, and regression line). The scatterplots in this case make obvious the differences that the statistics do not.



Correlating Crimes A scatterplot matrix lets you survey many relationships at once. Here, from data on 50 states, you can see a correlation between murder and rape but not between murder and auto theft.



transparent cube that you can rotate around any of the three axes. (We used Abacus Concepts' MacSpin 3.0 to show the plot in "Seeking a Relationship in a Data Stack.")

Picking out a relationship in this kind of plot is simple. You set the cloud of data points to rotate slowly around the axes, one axis at a time. If the cloud always looks like intergalactic mush, it means that there isn't a strong relationship between one variable and another. On the other hand, if some viewpoint on the cloud makes the points appear to compress or somehow line up, as in the example plot, you have discovered an underlying connection.

In the classic example given here, one view of the cloud simply shows that larger engines generally get worse gas mileage, but the technique works just as well for less commonplace observations.

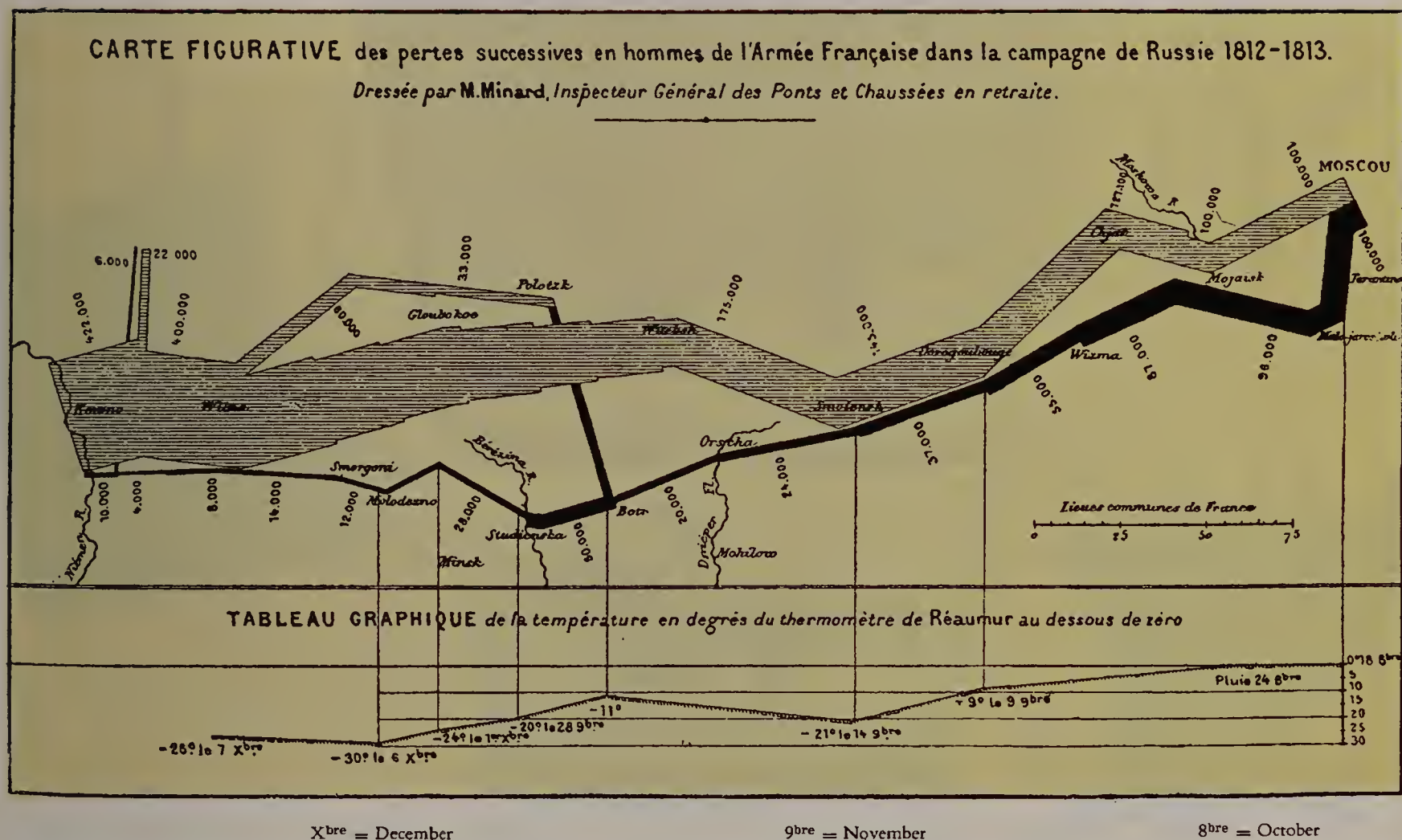
In an advanced three-dimensional scatterplot application, you can actually display a fourth variable (usually time) by letting this variable control an animation. You can watch the cloud of points evolve in time as you rotate them, so that time trends in data can be picked out separately from correlations between variables. With a little experience, you will be able to perform qualitatively correct analyses by eyeball, in a few minutes, something that would have constituted month-long studies with mountains of printouts only a few years ago.

The message is this: With the right representation of data, you can simply see what the data is telling you.

The Importance of Correct Colors IN THE PROFESSIONAL HANDBOOKS ON graphing, color has two recognized uses: quantization and categorization. The concept of color quantization is not profound—orange as hot, red as very hot, blue green as cold, and blue as freezing is the most typical use of this technique in everyday life. The familiar *USA Today* weather map is an example.

But some uses of color quantization are more subtle. Color can be used to add another dimension to a 2-D plot, as well as to plot quantities that have no direct sensory analog, as is often the case with scientific data. A common use of color quantization in science divides an arbitrary numeric scale into a color scale. An example is the colorization of charts dis-

WITH THE RIGHT REPRESENTATION OF DATA, YOU CAN SIMPLY SEE WHAT THE DATA IS TELLING YOU



playing ozone-depletion levels over the Antarctic that you see every once in a while on the evening news. Fractal images are represented this way, as are color CT scans and such abstract quantities as electron density in atomic orbitals (see "In Orbit," which was produced in Spyglass Transform).

Representation of categories in color simply means assigning colors to related groups of points. Although this assignment is considered so trivial in the case of bar and pie charts that the program does it for you by default, there's usually something to be gained by taking charge of color assignment yourself. To do this usually requires some effort as you slog through dialog boxes to change assignments, but the result is a figure that contains extra information that the viewer can easily perceive (for example, the clear separation of data clouds by engine type in "Seeking a Relationship in a Data Stack").

But color should not be used just because it is available. As an example, look at the classic graphic ("Still a Classic") by Charles Minard that shows the march of survivors of Napoleon's Russian campaign. The path of the soldiers (gray) on


the way to Moscow follows the actual route they took. Its width is based on the number of soldiers alive at each point along the way, graphically showing how many soldiers died. The black path follows the route of their retreat. Below the paths is a temperature chart showing the temperatures during the dates of the retreat. From October 18 to December 7, 1812, the temperature ranged from 0 degrees Centigrade (32 degrees Fahrenheit) to -26 degrees Centigrade (-15 degrees Fahrenheit), which was a main reason that so many soldiers perished during the retreat.

It's tempting to make the effects of the temperature more obvious by colorizing the retreat path so that the color changes (perhaps from light blue to dark blue) as the temperature declines. But the path is too thin to effectively show such color changes, and using color changes without the temperature graph would make it too hard to see the actual temperature on any given day.

The Tools Are at Hand

WITH THE HUMBLEST INTEGRATED software package for beginners, and a few days of practice on a Mac LC, you can

Still a Classic This image showing the diminishing number of survivors in Napoleon's 1812 march on Moscow and his subsequent retreat, plotted against the temperature, does not benefit from special effects available in today's graphing programs. It remains, as graphics guru Edward Tufte called it, possibly "the best statistical graph ever drawn."

produce data graphics that would have astounded the world ten years ago. With the most advanced graphing software (and equivalently powered Mac hardware), you can produce results that will astound the world now. Despite the orientation of many programs toward the producing of "conference room" three-dimensional bar charts, you are likely to find unusual and impressive styles of graphics that lend themselves to experimentation if you poke around in the program's features. 

See *Where to Buy* for contact information.

A research analyst and consultant, CHARLES SEITER is also a *Macworld* contributing editor who usually writes about mathematics, spreadsheets, and statistics.

HOW TO MAKE YOUR FIRST



QuickTime

APPLE'S NEW DIGITAL-MOVIE TECHNOLOGY has hit the streets, and there are already enough QuickTime products for sale to make your head spin. Wasn't QuickTime supposed to make movie-making *simpler*?

Fear not: here's the recipe. First, though, some psychological prep work—steel yourself to pay between \$500 and \$8000 for a digital movie-editing studio inside your Mac. Prepare to learn some new terminology. Make a *lot* of room on your hard drive—or, if you have a Bernoulli or SyQuest drive, grab a couple of blank cartridges. Understand from the get-go that we're not talking about Technicolor quality here—more like Max Headroom. And without an extra converter box, or a high-priced video board, you can't record the finished product with your VCR.

But rest assured that the jerkiness, high disk-space overhead, and tiny picture size of today's QuickTime movies will be state of the art for about as long as the 400K floppy disk was. By the time you read this—or much sooner—newly engineered products will flood the market. They'll make your movies smoother, more colorful, and more compact on your hard drive.

One Unpeeled Mac

LOGICALLY, DIGITAL MOVIES ON THE Mac shouldn't be possible at all. If you've worked with graphics, you know that just one color picture can take up a megabyte of disk space. When you watch TV, you're watching 30 pictures, or frames, per second. So you're going to ask the Mac to store—and play back—30MB per second? What are you, crazy?

That's why QuickTime is such an achievement. It pulls every trick in the book to reduce the amount of information

necessary to display video. First of all, most QuickTime productions play in a rectangle that's 160-by-120 screen dots (pixels) square—that's $\frac{1}{16}$ the size of the standard screen and much less information to store. Next, QuickTime compresses the file, discarding redundant information as it analyzes the color information in the movie.

Despite these data-reducing shenanigans, the Mac must still process a huge amount of information every second. Therefore, the first item in your equipment list for Desktop Pictures, Inc., is a fast Mac. At minimum, you need a 68020-processor Mac; you also need at least 5MB of memory and System 7. If you want to make your own movies with a camcorder, instead of just playing other peoples', you need a *digitizing board*. Technically, you don't need a color monitor, but QuickTime isn't very impressive in black and white. Finally, you need the QuickTime extension itself—a 440K file you can get from a user group, Apple dealer, or online service.

Stir In Video

TO MAKE YOUR OWN DIGITAL OPUS, BEGIN with a video source. A TV cable, VCR, or laser disc is fine if you want to play around with existing footage and can get permission to do so legally; get a camcorder if you want to shoot your own. With the relatively low quality of today's QuickTime flicks, the tape format doesn't much matter: *composite*, or home-video gear (like the VHS, VHS-C, and 8mm formats) make just as good digital movies as the more expensive *component* gear (S-VHS and Hi8 formats). (Better yet, of course, are professional $\frac{3}{4}$ -inch tape decks, which produce the highest-quality picture signal of all—the three-channel RGB signal.) As 1992 wears on, though,

Your First Time

BY DAVID POGUE

higher-quality QuickTime products will dramatically improve the picture. The caliber of your video setup will start to make a difference in your finished product. If you are buying a camcorder right now, it's probably worth planning ahead—get Hi8 or S-VHS equipment.

Once you have your footage in hand, shop for a digitizing board. This NuBus or PDS board slips into a slot in your Mac and provides a jack or two into which you can plug your video source.

Here's where the market gets interesting. There are three general types of digitizing boards: *frame-grabber* boards, which were originally developed for capturing still frames from live video, but have been modified to work with QuickTime; the VideoSpigot; and boards not available to evaluate by press time. The third category is the most intriguing of all.

Frame-Grabber Boards

WHAT MAGIC SPELL TURNED THESE former still-frame-grabbing boards into movie-making machines? A special component of the QuickTime software family called a *VDIG*. (Pronounced *VEE-dij*, it stands for video digitizing component, but nobody calls it that.) When you drop a VDIG into your System Folder, any program that can record QuickTime works with your digitizer board. For a list

of digitizing boards with VDIGs, see "QuickTime Input Features."

These born-again frame grabbers are often loaded with non-moviemaking features. They may double as full-color display boards for your monitor, let you watch real-time TV, or let you attach a secondary circuit board (a *piggyback board*) to provide extra features like acceleration or stereo sound.

It's important to understand that although these are excellent boards rich with features, you're likely to be disappointed with the captured footage—not by the picture quality (16-bit and 24-bit images are dazzling to look at) but by the frame rate (smoothness of motion). While TV is 30 fps, movies are 24 fps, and the QuickTime movies you've seen at user groups are usually 15 fps, these frame-grabbing boards average 6 fps to 12 fps at the smallest size (about 2 inches square).

Spigotville

THE NEXT CATEGORY OF DIGITIZER board has only one occupant today: the \$599 VideoSpigot, from SuperMac Technology. It is not a display board for your monitor. Nor is it meant to be a frame grabber, although it can capture an absolutely frozen image at half-screen size (a VCR on pause generally isn't quite still enough). It has only one video input

—for composite video, so you lose the high quality of S-VHS or Hi8 equipment. Instead of those frills, every centimeter of this specialized board was designed with low-cost, high-quality movie-digitizing in mind.

The VideoSpigot doesn't need a VDIG to record (but at press time it began shipping with one that is also available from SuperMac's folder on America Online, and in SuperMac's forum on CompuServe.) Instead, the Spigot comes with its own recording program, called Screen Play.

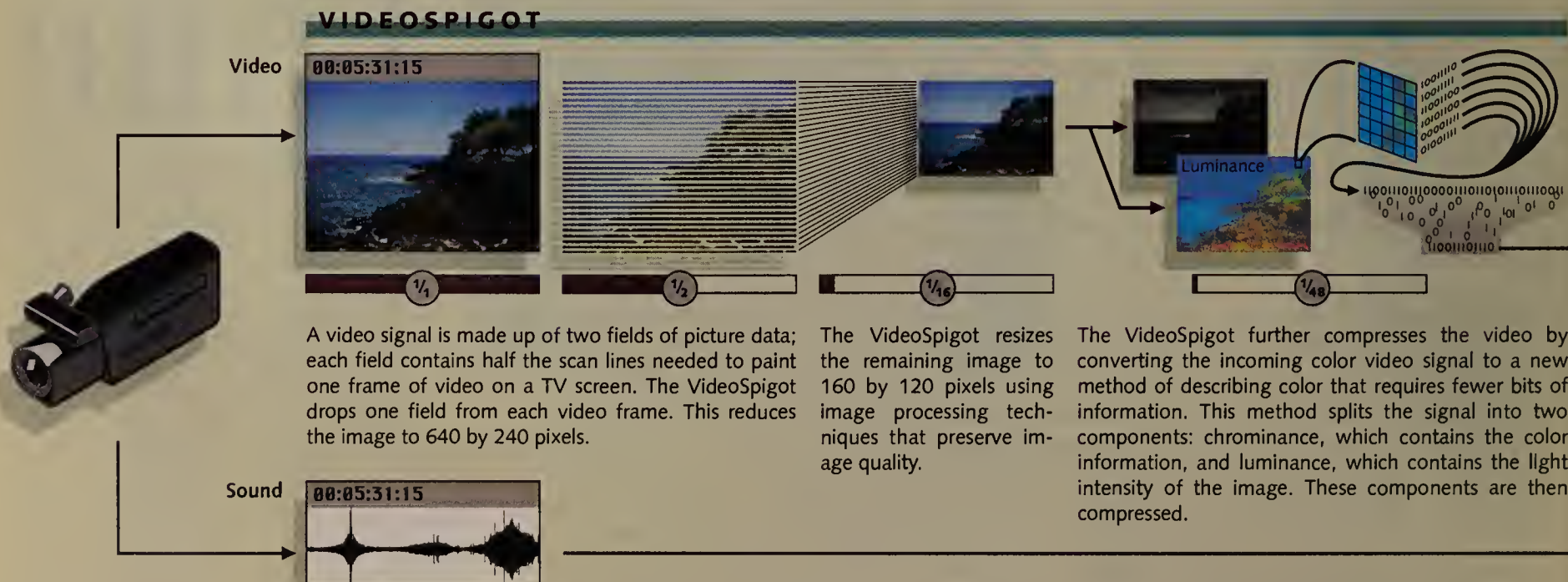
Frame-grabber-style boards can put the incoming video into one of two places: RAM (at a high frame rate but very short movie lengths); or, using the VDIG, directly onto a hard drive (at a low frame rate, but long movie lengths). The Spigot has no such trade-off: it records directly to a hard drive with a high frame rate. It accomplishes this feat, first, by devoting every iota of the Mac's processing power to the task of furiously storing video information into a temporary file on the hard drive; second, by performing some compression on the video (about 3:1) before it goes to that temporary file; and third, by displaying only a crude, 1-inch-square, black-and-white, choppy preview while you're recording; this saves the CPU's energy for the first step. (See "How the

How the VideoSpigot Works

Recording video to a hard drive at a high frame rate isn't easy. A video signal contains much more information per second than a hard drive can record. In order to capture video to a hard drive, much of the video

information must be thrown away, and the remaining video information must be highly compressed. This image processing must happen quickly so that the changing images can be recorded without discernible

skips and gaps. To win its QuickTime stripes, an input board must figure out how to preserve image quality and still record 12 to 15 frames per second.



Because the VideoSpigot doesn't digitize the audio signal that comes out of a video camera, you must use the Mac's built-in microphone or an external sound digitizer like Macromedia's MacRecorder to get your

video sound track into a QuickTime movie. Screen Play, the VideoSpigot's recording software, synchronizes the sound track by stamping each incoming sound chunk with a time code that shows hours,

minutes, seconds, and frame numbers. After the video has been compressed, the stamped time code is used to synchronize each video frame with its corresponding sound chunk.

VideoSpigot Works" for a technology lover's description of the process.)

Once the Spigot has created its large temporary file on a hard drive, you still haven't actually used QuickTime. Only when you use Screen Play's Save command does the footage get converted into QuickTime format and compressed.

Boards Not Available Yet

YOUR DIGITIZING BOARD CHOICES ARE soon to multiply. In the fourth quarter of 1992, SuperMac plans to release Digital Film (\$5999), a new video board that can grab full-screen video and record to hard disks at 30 fps with stereo sound. Digital Film will come bundled with Adobe Premier 2.0, will drive monitors up to 16 inches in 24-bit color, and will provide expansion capabilities. RasterOps' \$Quick Pak piggyback board (circa \$1800) will add high-octane circuitry to any RasterOps TV-line of boards, boosting your movies' playback speed to 30 fps even at full-screen size, without requiring the purchase of a Quadra.

Especially tempting is the VideoVision board from Radius (\$2399 including DiVA's VideoShop and Action from Macromedia). Using a special technology licensed from Apple, VideoVision will feature integrated audio, video, and full-color output to a VCR, as well as special slots

to accommodate expansion boards (for QuickTime acceleration or compression) from other companies. Using increasingly sophisticated high-speed compression circuitry, both of these boards will make QuickTime movies smoother, more colorful, larger on the screen, and smaller on the hard drive.

Sounding Boards

OF COURSE, CRAMMING DIGITAL VIDEO into the Mac is only half the battle. Then there's sound.

Fortunately, the Macintosh world is already familiar with digital audio. That's what you create whenever you use the MacRecorder, or the microphone that comes with recent Mac models. This sound isn't exactly CD-quality, but it's good enough for QuickTime. To record sound with your movies, you can use either the Mac mike jack (plugged into your video source's audio-out jack) or a MacRecorder. But if you have a MacRecorder, you have to have its *driver* software, which you drop into the System Folder. (This driver is available as part of SoundEdit Professional [\$295] or MacRecorder Sound System Professional [\$349], both from Macromedia; the driver is also available for free on AppleLink and America Online.)

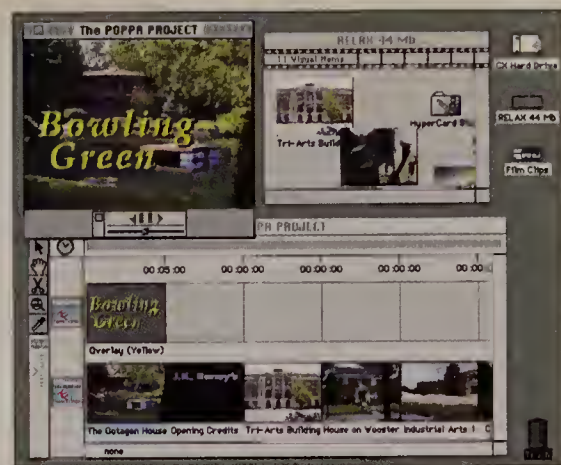
If you meet those conditions, the QuickImage and RasterOps boards can record sound and pictures simultaneously, as long as you're using a QuickTime recording program that supports a VDIG to do so. The VideoSpigot's Screen Play program can record sound, too. The QuickView Studio QT can't use the Mac's mike jack or the MacRecorder; you must purchase QuickView's \$395 sound piggyback board.

If 8-bit, Mac speaker-quality sound isn't hi-fi enough for you, then you can pay \$1295 for an Audiomedia II board from Digidesign, which, when seated into another slot in the Mac, gives you CD-quality sound. Otherwise, wait for some of the new QuickTime-production boards that are being readied for prime time.

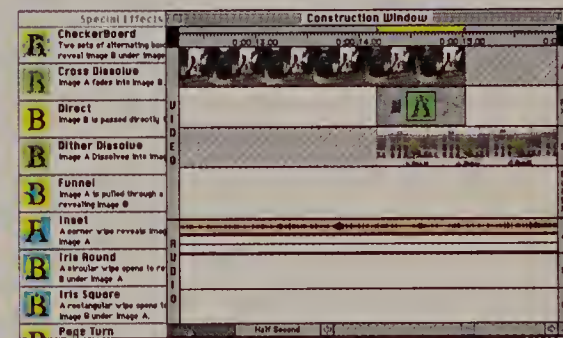
How Small Do You Want It?

SUPPOSE YOU'VE SELECTED A DIGITIZING board, hooked up your videotape player, and captured a juicy segment of video. You play it back on the screen; it looks great. You want to save it as a movie file on your hard drive, but without taking over all 40MB. Enter QuickTime.

When you save the file, you'll be asked to choose a compression method. If you want to sound impressive at cocktail parties, use the term *codec*—that's techie shorthand for compressor/decompressor, the piece of software that determines how



In the Shop Notice three things about DiVA VideoShop. First, you always have access to your hard drives and folders; QuickTime files show up as large icons (top right), which you just drag into a track (bottom) to edit. Second, you can have unlimited multiple video tracks. They play simultaneously, either side by side or on top of one another—that's why it's so easy to create superimposed titles (top left). Third, you can always get an immediate playback of your movie-in-progress (top left). You can jump from any frame of the playback to the corresponding frame of the time-line view—and vice versa.

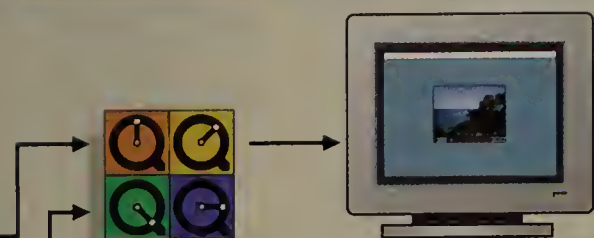


Making Tracks Adobe Premiere's time-line view, the Construction Window, holds seven horizontal strips: three video tracks, three audio tracks, and a special-effects track. In this illustration, a gray cross-fade icon has been dragged into position between the end of the top scene and the beginning of the lower one. Transitions like these are Premiere's best feature; a few of them are listed at left in the Special Effects window.

a movie file should be condensed. Most QuickTime products come with a selection of codecs: one works best for video, another for animations, another for still images, and so on. More codecs are being developed. Each strikes a different balance between picture quality and the space the file takes up on a hard drive.

Welcome to the world of QuickTime, where you eat, sleep, and breathe trade-offs. The better the quality of the movie, the more disk space it's going to take. The options you're given when you save your movie are all variants on that theme. Smaller files mean worse quality, because more color information has been discarded. More frames per second result in smoother motion but bigger files. Twenty-four-bit color equals bigger files *and* choppy playback, because the Mac is being asked to process much larger chunks of information in the same amount of time. (Record in 16-bit color if you can;

QUICKTIME



When the movie is played back on the Macintosh screen, the SuperMac video compressor component of the QuickTime system software decompresses and displays the images in RGB color.

it looks almost as good as 24-bit color, but requires the Mac to process only half as much data.) A larger movie window equals slower motion; once again, the Mac has to skip frames of the movie to keep up with the flow of picture info. Sound, too, muddies the issue: if you're recording sound with your picture, you get a slower frame rate, because part of the Mac's attention is devoted to recording sound.

Keeping in mind that a lower frame rate means a jerkier movie, here are some examples. On a Mac IICx with 8MB of memory, the VideoSpigot can capture a soundless 8-bit movie at about 15 fps—if the window is at its smallest size, 160 by 120 pixels. (Record directly into memory, and you get an impressive 24 fps—but the top movie length is 8 seconds.) Record sound simultaneously, and you lose 3 fps. Double the window size, and you get half the frame rate. Use the VideoSpigot VDIG software instead of its Screen Play recording program, and you sacrifice two-thirds of your frame rate. Wait a few months, and you'll be able to capture 24-bit full-screen video with sound at 30 fps. You get the idea.

In the meantime, you can increase your odds of capturing high-quality footage by saving movies onto a fast, freshly defragmented hard drive.

The Cutting Room

ONCE YOU'VE CAPTURED A PILE OF raw film clips, you need an editing program to assemble them into some kind of artistic order. The \$99 Apple QuickTime Starter Kit is one possibility; it's a CD

ROM full of video clips and some floppy disks containing simple moviemaking programs, one of which lets you copy and paste pieces of your movies. But if you want to edit sound tracks, do cross-fades, or superimpose titles, you'll need one of the Big Two: Adobe Premiere 1.0 (\$495; bundled free with the VideoSpigot) and DiVA VideoShop 1.0 (\$599).

When you run VideoShop, the screen changes completely. You still see your disk and folder icons, as though the desktop were still there, yet VideoShop hides everything except QuickTime documents (and the folders that contain them). To prepare a QuickTime movie for editing, you drag its icon from its folder into a time-line window, where you see each frame side by side like a filmstrip (see "In the Shop").

Editing is simple. You drag to select frames, just as you select letters in a word processor. If three frames of a shot are ruined because a truck drove past the camera, select those frames and press the delete key. Presto: history rewritten.

At any time, as frequently as you wish, you can view your movie-under-construction in a playback window, which has the usual movie controls—play, stop, back up a frame, fast forward, and so on. To make navigation easy, you can drag the playback window's "scrubbing" control back and forth (and watch/hear the movie backward and forward) to locate a specific frame, then double-click on the picture. Instantly the time-line window jumps to that frame, so that you can go to town with the editing tools.

Those tools include much more than just cut, copy, and paste. If you place a second movie end-to-end with the first, you can create a smooth transition between them: a cross-fade, a page-turning effect, and so on. A Paste to Fit command lets you paste some footage into a preselected slice of time; in other words, you can create slo-mo (or fast-mo) effects. There's also a series of special-effect filters. Some are Photoshop filters, which you can apply to any stretch of your film. Others affect the movie over time, such as the fade-to-black filter. VideoShop also lets multiple video tracks play simultaneously. You can position these independent movie screens side-by-side or superimpose them. You can designate one particular color of a superimposed scene to be transparent, so that (for example) the forests of Brazil are visible through the transparent-white of your best friend's teeth.

VideoShop's most attractive feature, though, is that it's currently the only QuickTime editing program that lets you record directly from any VDIG-equipped video board. VideoShop's arch rival, Adobe Premiere, doesn't yet support VDIGs, so you can't capture movies directly within Premiere, you have to import them into the program.

Not all is light and clarity in VideoShop, though. The bare-bones manual was written so far in advance of the program that it's measured in errors per second. Applying transitional effects takes a long time. And, as the Too-Much-Data-for-the-Mac-to-Handle Theory suggests, playback bogs down when you use some

QUICKTIME INPUT FEATURES

General	Computer Friends	Display Research Laboratory	E-Machines	Mass Microsystems	New Video Corporation	Radius	Radius	RasterOps Corporation
Product	ColorSnap 32+	MR Shot 1/LC	QuickView Studio QT	QuickImage 24	EyeQ Authoring System	VideoVision ¹	RadiusTV	RasterOps 24STV
Price	\$995 ³	\$500	\$1799	\$495	\$4495	\$2399	\$1695	\$999
Slots required (number/type)	1/NuBus	1/PDS	1/NuBus	1/NuBus	2/NuBus	1/NuBus	1/NuBus	1/NuBus
FEATURES								
Also serves as regular display board	○	○	○	○	●	●	○	●
Bit depth	NA	NA	NA	NA	8, 24 bits	8, 24 bits	NA	24 bits
Monitor sizes supported (in inches)	NA	NA	NA	NA	13	13, 16, 19, 21	NA	13
Includes VDIG component	○	●	●	●	●	●	●	●
Expandable (with expansion board)	○	○	●	○	●	●	○	●
Includes QuickDraw acceleration	○	○	○	○	○	○	○	○
On-board video compression	○	●	○	○	●	○	○	○
Still-frame grabber	●	●	●	●	●	●	●	●
Hardware pan and zoom	○	○	○	○	○	○	○	●
INPUT								
Video inputs (composite, S-VHS, RGB)	C, S, RGB	C, S	C, S, RGB	C, S	C, S, RGB	C, S	C, RGB	C, S
Built-in TV tuner	○	○	○	○	○	○	●	○
Built-in sound digitizer	○	○	○	○	16-bit stereo	8-bit stereo	8-bit mono	○
OUTPUT TO VIDEOTAPE								
Converts signal to NTSC scan rate	○	○	○	○	●	●	○	○
Encodes Mac RGB signal to composite	○	○	○	○	○	●	○	○
Requires add-on for tape output/price	○/NA	○/NA	●/\$499	○/NA	○/NA	○/NA	●/\$599	●/\$599

● = yes; ○ = no; NA = not applicable. ¹ Board due to ship in fourth quarter of 1992. ² Board due to ship in July 1992. ³ Available with DiVA VideoShop as MovieProducer (\$1195). ⁴ PDS adapted

QuickTime Input Boards

Selecting a video-input board isn't quite as easy as choosing an ice cream flavor. Some boards, for example, are regular display boards for a monitor (which—if you use any two-piece Mac except the IIsi, IIfx, and Quadra—you already have). If you already own a Mac, a display board may be redundant; if you don't, getting a display and movie-making board in one package may be a good deal. A note to IIsi, IIfx, and Quadra owners: Even though you don't technically need a display board for your monitor, don't forget that adding a display board *anyway* can significantly speed up your display. Even if you decide to get a board that's also a display board, life doesn't get much simpler. You have to worry about what *bit depth* the board is. (Apple recommends 16-bit color for the best QuickTime movies.) You should also take into account which monitor sizes the display board can handle; some of them, for example, work only with 13-inch monitors, which isn't much help if you've spent a couple months' salary on a larger color monitor. Finally, check to make sure you have enough slots in your Mac to accommodate the board you're considering—the occasional board listed in the table is actually *two* boards, requiring two slots.

Feature Attractions

Some boards give you *hardware pan*, which sounds like a bad equipment review but is actually the ability to display an image that's larger than the glass of your monitor; you can shift the picture to

bring hidden portions into view. *Hardware zoom* lets you blow up each dot of the screen to twice its size, magnifying the image.

If you plan to record your movies onto videotape, you have another set of stats to study. Unfortunately, the Mac video signal and a TV signal are different enough that special converters are necessary. There are two steps to converting one to the other: converting the *scan rate* of the signal to the type required by your VCR, and converting the color information. Most boards that provide tape-output features handle both steps. You can see in "QuickTime Input Features," by the way, that some boards don't have tape-output features built in, but offer that function as an additional-cost add-on.

And speaking of TV, you'll have to decide how important sound and picture quality is to you. There are three kinds of video-signal types for your QuickTime footage, and each requires a separate kind of jack on your video board: *composite*, which is the usual TV, VCR, or VHS camcorder connector; *S-video*, like the S-VHS and Hi8 videotape recorders that provide a sharper picture; and *RGB*, the pro format that has separate jacks for red, green, and blue color signals. Check the table to see which boards accept which signals. Also check to see what kind of sound recording you can expect. If the table shows that a board can record in *8-bit mono*, that's the same quality you get when you record with the Mac's included microphone or with a MacRecorder. *16-bit sound* is CD quality but takes up more disk space. And *stereo*, of course, is stereo.

of the juicier features—multiple tracks (for superimposing titles), for example, or cross-fades. When you save an edited movie, of course, these playback problems go away; VideoShop compiles all your tracks, clips, and sound bites into a single, unified, one-track QuickTime movie. The interface takes some getting used to, too, and you can't smoothly adjust audio levels over time, as you can in Premiere.

Editing in Reel Time

ADOBE PREMIERE SHARES A FEW ELEMENTS with VideoShop: both have a window that displays icons for your various clips (like VideoShop's folders), and a time-line view that shows you horizontally arrayed frames, for editing. As in VideoShop, you drag clip icons into parallel tracks of the time line; also as in VideoShop, you can superimpose or create

cross-fades (and other transitions) between the clips.

Premiere's interface is easy to grasp; there's no fumbling for different tools that work only in specific modes, as in VideoShop. Cross-fades and other transitions are especially easy to create. Easy to modify, too—to make an effect last longer, you just grab it with the mouse and stretch it.

RasterOps Corporation	RasterOps Corporation	RasterOps Corporation	RasterOps Corporation	SuperMac Technology	SuperMac Technology	SuperMac Technology	Truevision	VideoLogic	Workstation Technologies
RasterOps 24XLTV	VideoTime	MediaTime	RasterOps MxTV	VideoSpigot	VideoSpigot Pro	Digital Film ²	NuVista+	DVA-4000/ Macintosh	WTI-Moonraker
\$3499	\$1499	\$1999	\$2199	\$599	\$1599	\$5999	\$2995-\$4795	\$2395	\$1499
1/NuBus	1/NuBus	1/NuBus	1/NuBus	1/NuBus or PDS	2/NuBus ⁴	1/NuBus	1/NuBus	2/NuBus	1/NuBus
●	○	●	●	○	●	●	●	●	○
24 bits	NA	24 bits	24 bits	NA	⁵	24 bits	8, 16, 24 bits	8 bits	NA
13, 16, 19, 21	NA	13	13, 16	NA	13, 16, 19-21	13, 16	13, 16, 19	13	NA
●	●	●	●	●	●	●	●	●	●
●	○	●	●	○	○	●	○	○	●
●	●	○	●	○	●	●	○	○	●
○	○	○	○	●	●	●	○	●	○
●	●	●	●	●	●	●	●	●	●
●	○	●	●	○	●	●	●	○	●
C, S, RGB	C, S	C, S	C, S	C	C	C, S, RGB	C, S, RGB	C, S, RGB	C, S, RGB ⁶
○	○	○	○	○	○	○	○	○	○
○	○	16-bit stereo	○	○	○	16-bit stereo	○	○	○
○	○	○	○	○	●	●	●	○	○
○	○	○	○	○	○	●	●	○	○
●/\$599	○/NA	●/\$599	●/\$599	●/ ⁷	●/ ⁷	○/NA	○/NA	●/\$2395	●/\$375

uded. ⁵ 24 bits at 13"; 16 bits at 16"; 8 bits at 19"-21". ⁶ Accepts two inputs displayed in separate windows simultaneously. ⁷ Not available from SuperMac.

But unlike its competition, Premiere removes you from the immediacy of seeing what you've just done. Each time you want to view part of the assembled movie, you select a region in the time-line view, then invoke the Preview command. Premiere displays the stopwatch for a while as it computes, then it shows you a low-quality, jerky preview of the selected snippet. *Once.* You can't rewind it, scroll back to see a particular frame, slow it down, or even see it again (without using the Preview command a second time). It's reminiscent of Adobe Illustrator, where you edit your artwork in a wire-frame view; you can see colors, shadings, and objects' opacity only in Preview mode (where you can't make any changes).

Navigation is tough in Premiere, too. When you watch a raw, unassembled clip (this viewing doesn't require the time-consuming Preview process), you can slap a numbered marker onto any frame. Then, by pressing a number key, you jump instantly to that frame.

Unfortunately, that navigational aid is pointless, since you can't edit anything when you're viewing a raw clip. You can edit only in the time-line window—yet there aren't any markers in that view. You can jump to the first frame of any clip—but beyond that, the only navigational control in the editing window is a scroll bar. While you're dragging the scroll box, you get no feedback as to where you are in the movie (like "frame: 100"). You have to guess where you are, let go, wait for the entire window to redraw each color frame, discover that you're in the wrong place, and go for the scroll bar all over again when you're trying to make changes in your clip.

Premiere's editing strength is its ability to manipulate several layers of information (see "Making Tracks"), although it can't play back side-by-side clips. Sound tracks appear as additional strips, and they can be edited independently—you can adjust each sound track's volume graphically, and you can mix several audio tracks.

The program's editing weakness, though, is that it thinks in clips, not frames. You can't select a few frames and snip them out, as you can in VideoShop. To delete that passing truck in Premiere, you'd have to create two copies of the clip—one cropped to end just before the truck appears, and the second cropped to begin just after the truck has passed.

And there's no Undo.

Rough Cuts

IN PREMIERE 1.0, YOU CAN'T SEE HOW the final product will look until you use the Make Movie command. Much like VideoShop's Save command, Make Movie

takes quite a while. It creates a completely new QuickTime file that incorporates all the editing and effects you've specified. The best part of the entire process is watching the finished movie; both Premiere and VideoShop have a special command that centers the playback window on a blackened screen. It looks terrific.

Like everything in the QuickTime world, of course, the editing-software market is rapidly expanding. Nearing completion is VideoFusion, from VideoLake, for example, a high-power editing program that can pan, zoom, filter, and distort movies to a new high in desktop-produced special effects.

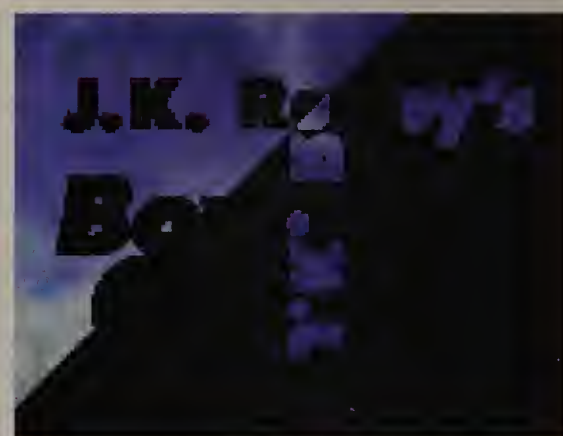
Adobe hopes to address some of Premiere's shortcomings with version 2.0, which is expected to ship by August 1992. According to the company, the new version will provide better interactive editing, support VDIGs (so you can record directly into the program), and have multiple levels of Undo. The program will also let you open a sequence of frames in Photoshop, called a Filmstrip, for retouching or colorizing.

Until those improvements materialize, VideoShop makes a more natural and creative editing environment, since you have a clear view of your work in progress at all times. Premiere's method of applying transitions between shots is much superior, and it's easier to learn. But the cumbersome Preview feature teaches you to avoid viewing your work as much as possible; in a medium as visual as movie-making, that's like trying to sculpt clay with your eyes closed.

Final Print

WHEN YOU FIRST SEE WHAT ALL THE fuss is about—a tiny, jittery movie the size of a matchbox, with tinny sound—you might wonder why it's worth spending the money and learning the terms. But a hundred companies rushing products to market must know something. They probably remember the primitive beginnings of desktop publishing.

Whoever coined the term QuickTime must have been thinking of this technological revolution's speed. Already The NEC Video Sequencer (a program from Light Source) lets you control the NEC PC-VCR, frame by frame, from your Mac. Zorro, software from Mass Microsystems that is due out in the third quarter of 1992, promises frame-by-frame control over supported video devices through the use of a proprietary serial interface remote controller. In other words, one day soon, a QuickTime movie will be only a mock-up of a real movie—which your Mac, controlling a pair of tape decks, will automatically construct. Within a



Premier FX In this time-lapse example, you can see one of Adobe Premiere's most dazzling effects—the Page Turn, where one video clip peels away to reveal another one underneath.

couple of years, analog (tape) machines may disappear from the loop entirely: the quality of digital movies on the Mac will be so high that they can be used as actual broadcast material. For thousands of Mac fans and video pros, the arrival of that time can't be quick enough. **m**

See *Where to Buy* for contact information.

Contributing editor DAVID POGUE is the author of *Macs for Dummies*, published by IDG Books Worldwide. He began his moviemaking career with a QuickTime movie about his 102-year-old grandfather.

PIXAR typestry

The Greatest Software for Creating Dimensional Type

IT'S EASY

Pixar® Typestry™ turns your Type 1 and TrueType fonts into dimensional text. You work in a familiar 2-D space so you can't get lost. It's a 2-D design experience with 3-D results.

IT'S AMAZING

Pixar Typestry is great for adding pizzazz to your documents, creating riveting presentations, and designing classy logos.

You can place your text wherever you want it and dress it with any number of interesting Looks. You can choose lights to add highlights or cast shadows and use dingbat-type fonts as decorative ornaments.

IT'S POWERFUL

Just by picking from a menu, you can add motion blur, perforations, shadow patterns and gels to your picture. If you want, you can even animate your text and make a QuickTime™ mini-movie.

IT'S PRACTICAL

Typestry images can be gracefully imported into other applications like Photoshop™, PageMaker™, and Quark™. Our alpha channel eliminates the need for time-consuming editing. High resolution images can be generated for slides, print or video.

IT'S RENDERMAN

Within Typestry is Pixar's powerful RenderMan®. This invisible wizard will transform your image into a professional quality masterpiece that will amaze you. It's the very same RenderMan that was used to create the special effects in some of your favorite films.

Pixar Typestry is a RenderMan family product. It is fully compatible with Pixar's Showplace™, MacRenderMan™ and NetRenderMan™ for faster rendering. It can also be used with many other fine RenderMan products including the wonderful Looks libraries offered by third parties such as The VALIS Group.

Pixar Typestry retails for \$299⁰⁰ at your favorite Macintosh store or call 1-800-888-9856.

P • I • X • A • R
1001 WEST CUTTING BLVD. ♦ RICHMOND, CA 94804
TEL: 510/236-4000 ♦ FAX: 510/236-0388

©1992 Pixar. All Rights Reserved. Pixar and RenderMan are registered trademarks of Pixar. Typestry, Showplace, MacRenderMan and NetRenderMan are Trademarks of Pixar. All others are Trademarks of their respective companies. Prices subject to change without notice.



Reviews

IN THIS ISSUE: RasterOps CorrectPrint, Norton Utilities, MacTools, LetraStudio, The Miracle Piano Teaching System, The Bat, Nok Nok, easyPrint, Kid Pix Companion, and more

Spreadsheet

Microsoft Excel 4.0

PROS: Many new convenience features; customizable tool bar; added analytical tools. **CONS:** Slower than 3.0 at most tasks; Wizards a work-around rather than a solution; Toolpak of uneven quality. **COMPANY:** Microsoft Corporation (206/882-8080). **REQUIRES:** Mac Plus; 2MB of RAM for System 7 or MultiFinder; hard drive; System 6.0.2. **LIST PRICE:** \$495.

MW ★★★★★

WHAT DO YOU DO FOR AN ENCORE when you're already the hottest act in town? That's Microsoft Corporation's problem with Excel, which has dominated the Macintosh spreadsheet market. Microsoft expanded the working tool set in the spreadsheet and made Excel easier to customize. The result is a product that needs 2MB of RAM for practical use and runs a bit slower than its predecessor, but includes everything you could wish for (and more) in a spreadsheet.

The New Look

MICROSOFT'S DILIGENT MARKET RESEARCHERS have concluded that the typical user spends much more time formatting spreadsheets than recalculating, so Excel 4.0 is loaded with new formatting features. First, the tool bar, introduced in 3.0, features a different default set of items (outlining is off, font sizing is on). But since Microsoft also worries that perhaps its statistically validated cross section of users might not represent *you* ex-

Better ★★★★★
★★★★★
★★★★
★★★
★★
★
Worse



PETER HOEY

actly, the entire tool bar is now customizable. You can drag items away, replace them with icons for other tasks from a predefined set, or make up your own icons on your own named tool bar and link them to Excel commands, or, for that matter, to macros. If you don't want to learn anything new, you can just call up the Excel 3.0 tool bar, also provided. If you are too lazy to drag the mouse all the way to a tool bar, ⌘-option-click calls a pop-up menu of likely menu choices right under the cursor. And if you don't want to format spreadsheets yourself, Autoformat gives you a choice of 14 nice formats, which, we are earnestly assured, were produced by professional designers.

There are numerous other "sheet management" functions. You can now select blocks of cells and drag them around with the mouse (the Drag and Drop func-

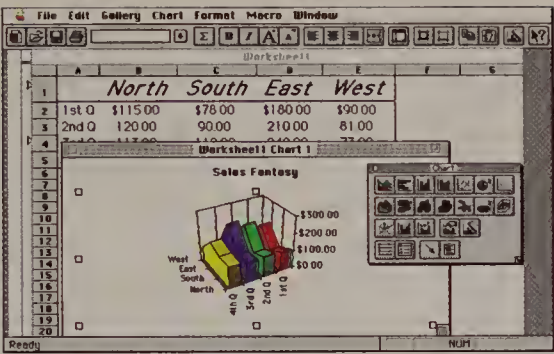
tion). There's an Autofit function to adjust column widths and row heights. There's an Autofill function that fills in the rest of a predictable series from a single entry—select *Jan* and drag down, and you'll see *Feb*, *Mar*, and so forth fill in order. Always losing track of files? Now you can keep related files in a workbook that opens them all at once. Can't spell? There's a spelling checker. Forget charting procedures? There are Wizards (really just a dialog box-plus-help) to step you through the still-clunky sequences for chart modification (at least there's a new chart tool bar). Need to do a presentation? There's a Slide Show manager. Keep different spreadsheet views, detailed or condensed? Ah, that would be the function of the new View Manager. Coffee getting cold? Excel 4.0's context-dependent Help will probably realize this and tell you to

put the cup on top of your monitor. None of these functions is a particularly monumental programming accomplishment (in fact, many of them have appeared in other software first), but they have a cumulative impact: you can put together a professional-looking, amaze-the-boss report in 4.0 as fast as you can type in the numbers.

But Wait

THERE'S MORE! THE LIST OF FINANCIAL functions has been expanded past old standbys like PMT to include TBILLYIELD and about 20 other money marketers' favorites. New engineering functions include Bessel functions, imaginary arithmetic, and all sorts of number-base conversions. Even the time function list has new entries—NETWORKDAYS is one example. Building on the new function lists, Excel has included an analysis Toolpak with an array of statistics tests from simple descriptive statistics to ANOVA, and a Fourier analysis routine (the Toolpak is called up as needed from the Utilities menu to save memory).

More to the point for business users, who may in fact seldom be called on to solve circularly symmetric vibration problems at work, are the new Scenario Manager and database crosstabs. Excel still has the best Solver of any current spreadsheet, and the Scenario Manager (an add-in module, meaning again that it's called up from disk when needed) basically lets you organize a set of "what-if" Solver problems as a group, recording outcomes for changes in input parameters. This is a serious improvement over the facilities in 3.0, for two reasons. First, most realistic business simulations call for a large spectrum of "what-if" analyses rather than single-variable tests, and Scenario Manager can keep track of all the tests you are likely to formulate. Second, the new set of statistical distribution functions (Weibull, for example) built into 4.0 makes possible really sophisticated work—before 4.0 you needed third-party simulation programs to make models at this level. Crosstabs are another useful feature, new in the Database menu. You can save different Crosstab views (one might be sales per quarter by region, one might be sales of each



Charting the Way It's easy to sample charting styles with the new icon menu for charts, and chart drawing itself is faster. Wizards will step you through the details of chart modification, but the details are for the most part the same old Excel procedures.

brand of product by region) from the same database, and print them in sequence for a report.

Autosum

SCENARIO MANAGER AND THE Crosstab function, like the formatting aids, show that Microsoft has indeed been listening to users. What the users are saying is that they need to impress the next level up in their respective corporate food chains to survive in the nineties. Excel 4.0 is a smashing success in this context.

Still, it's possible to have some misgivings about this giant product. There are no obvious changes in the core computing engine, so performance has taken only a moderate hit with expansion. The vast range of customization possibilities will be welcomed by old Excel hands, but the program is now less accessible to beginners. The new functions may have laid waste several sections of the market for third-party macro packages, but some of these additions suffer from mediocre implementation. The statistics in the Toolpak, for example, are limited in scope and unreasonably slow; if you need a bit of statistics, invest \$14.95 in Course Technology's MYSTAT disks-plus-textbook package. Similarly, if you use Crosstabs regularly you need Brio's DataPivot and not Excel's minimal approach, and for real Fourier analysis on data sets larger than a handful of points you had better turn to Bimillennium's HiQ (see *Reviews*, this issue) or The MathWorks' MATLAB. In filling all possible customer

wishes, Excel has picked up as excess baggage some functions at which it is not particularly good.

On balance, though, Excel 4.0 is the premier business tool on the Mac. Almost all 3.0 users will want to upgrade; almost no one will want to defect to another spreadsheet; hybrid Mac-PC offices will love 4.0's perfect compatibility with the Windows version released earlier; and product managers for competing spreadsheets will just have to dive for niches. This program will dominate for a long, long time.—CHARLES SEITER

Disk Utility Packages

MacTools 2.0

PROS: Automatic disk scanning and repair; includes antivirus utilities; fixes damaged Word and Excel files. **CONS:** CP Backup could be easier to use. **COMPANY:** Central Point Software (503/690-8090). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0.5. **LIST PRICE:** \$149.



Norton Utilities for Macintosh 2.0

PROS: Excellent disk repair and file recovery. **CONS:** Inconsistent interface between utilities. **COMPANY:** Symantec Corporation (800/441-7234). **REQUIRES:** Mac Plus; System 6.0.4. **LIST PRICE:** \$149.



UNTIL NOW, THE CHAMPION OF file-recovery packages has been Symantec's Norton Utilities for Macintosh (NUM). But with the release of Central Point Software's MacTools version 2.0, NUM will have to share the top of the data-recovery heap.

Norton Utilities for Macintosh

NUM VERSION 2.0 ADDS SOME NEW features to the previous version and incorporates portions of the now-discontinued Symantec Utilities for Macintosh. This amalgamation of the two packages gives NUM 2.0 a wide range of utilities, but the package lacks focus; it's the everything-including-the-kitchen-sink approach.

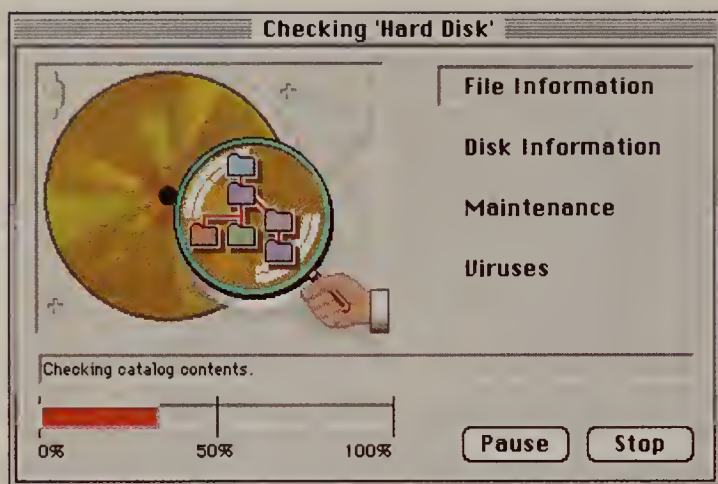
NUM's main business is disk repair and file recovery. It provides three approaches to dealing with a damaged disk. The first is FileSaver, a control panel that makes invisible backup files of the drive's directory, on your hard drive. To be able to create these backup files, FileSaver must be installed and running before you

continues

SPREADSHEET SPEEDS

	Open	Save	Insert/Delete	Recalc Plain	Recalc Math	Sort
Excel 4.0	11.8	27.5	18.0	9.6	26.5	9.2
Excel 3.0	11.3	24.5	17.2	9.4	21.0	8.8
Lotus 1-2-3 Mac	13.3	9.3	10.1	9.8	37.5	12.1
Resolve 1.02	4.0	8.4	19.4	9.6	14.4	15.8

Tests were run on a Macintosh IIfx with 4MB of RAM and System 7.0.1. Files used were in native file formats and consisted of 10 fields with a database of 1200 records; worksheet size was 2 sheets, with 10,000 cells. The Autorecalc and Undo features were turned on. Times are in seconds.



Looking Good, Doing Good MacTools' DiskFix shows off its attractive 3-D-style user interface; this style is used throughout the other utilities in the package, contributing to MacTools' superior ease of use.

experience problems. FileSaver can automatically update the backup of the directory on shutdown, or you can update when you press a user-definable hot key. The FileSaver files are used by two other utilities in the package: UnErase, which recovers files that have been put in the Trash Can; and Volume Recover, which resurrects your entire hard drive if you've accidentally erased it. The next approach is the excellent Norton Disk Doctor, which attempts (and usually succeeds) to repair damaged hard drive or floppy disk directories. And the last approach, used when Disk Doctor doesn't work, is to use UnErase or Volume Recover to recover individual files to another medium.

The combination of these utilities does an excellent job diagnosing and repairing damaged hard drives and floppy disks. Disk Doctor fixes most damaged hard drives; UnErase seems almost miraculous in its ability to bring back trashed files. And if you haven't installed FileSaver, NUM still has a good chance of recovering your files, although it might take longer and be less reliable.

Norton Backup backs up files to floppy disks, removable cartridges (SyQuest, Bernoulli, and optical), or to another hard drive (but not to tape drives). You can choose between full, partial, or incremental backups. Unlike Dantz Development's DiskFit Pro, Norton Backup doesn't erase old versions of backed-up files, so the backup disks are ever-growing. NUM includes a scheduling extension that lets you back up unattended if the backup medium is large enough, or it reminds you to back up if you're using floppy disks.

Speedy Disk, a hard drive optimization utility, is mostly unchanged since the last version of NUM. It does a good job of defragmenting hard drives for better performance. Directory Assistance II modifies the Open and Save dialog boxes, adding a menu bar that lets you move eas-

ily between drives and folders, and view the file list by Name, Date, Size, and so on. Disk-Light puts a small icon in your menu bar that flashes to indicate disk activity. Wipe Info and Norton Encrypt are security utilities. Wipe Info performs multiple overwrites on erased sectors to ensure that file recovery is impossible, and Norton Encrypt requires a password to read the scrambled files. Fast Find is a high-powered file finder. Floppier improves on the Finder in copying and formatting floppy disks. Key-

Finder shows you the entire contents of a font set at a glance, and tells you which key to press to get the character you want. It's a little better than Apple's Key Caps DA, but not much. Layout Plus lets System 6 users adjust the file views, the font used, and so on, of the Finder. And Norton Disk Editor lets you view and modify the bits and bytes on your hard drive or floppy disks.

The NUM manual is laid out well for the panic-stricken user who has bought the package specifically to save a bad drive, with step-by-step instructions for recovery, and a section on common problems and their solutions. The manual explains the utilities well, and it includes the Norton Disk Companion, a terrific, clearly written guide to how hard drives and floppy disks work. Symantec's technical support was prompt and knowledgeable when I called.

MacTools 2.0

THE MACTOOLS 2.0 PACKAGE HAS A tighter focus than NUM, zeroing in on disk and data protection. Central Point includes a complete virus-protection program in the package. CP Anti-Virus has an application and a control panel to scan your hard drive and floppy disks for any viruses. Updates to the virus detector for new viruses are widely available; since they are simply character strings that are typed into CP Anti-Virus, Central Point notifies registered owners by postcard and publishes the strings on America Online, CompuServe, and other networks.

MacTools' equivalent of NUM's FileSaver is called Mirror. DiskFix is MacTools' disk- and file-repair utility. It works as well as does Norton's Disk Doctor, but with several useful differences. The best of these differences are that all repair operations can be undone and that DiskFix can save a snapshot of the catalog file it is working on before the repairs are complete. This is a great idea, since in rare

cases, using any file-repair utility can make matters worse instead of better. DiskFix uses Mirror's backup catalog files to unerase hard drives. I found DiskFix considerably slower than NUM's Disk Doctor, but no less efficient at fixing hard drives. In fact, DiskFix repaired some directory damage on my hard drive that Disk Doctor reported it was unable to repair. DiskFix can also be set, using the CP Scheduler cdev (control panel in System 7), to scan your hard drive at specified intervals and automatically repair any damage it finds. CP Undelete uses Mirror's files to recover trashed documents, but also works without Mirror's help.

CP FileFix recovers damaged Microsoft Word 4.0 or Excel 2.2 and 3.0 files. It extracts the text from the damaged Word file and copies it to a new document. Excel files that can't be opened in Excel are similarly read and the readable portions copied to a new spreadsheet.

Central Point's backup program has much the same feature set as Norton Backup, with the exception that CP Backup can back up to some tape drives: the discontinued Apple 40 Mb DC-2000 drive and WangDAT's 1300 and 2600 DAT drives. According to Central Point, more varieties of tape drives will be supported in future versions.

MacTools' 3-D-style interface makes it easy for the inexperienced to move around the many parts of the package. NUM suffers in comparison; its various components have wildly differing interfaces. MacTools also includes a disk-editing utility, a hard drive optimizer, and finally, DriveLight, another hard-drive-icon-in-the-menu-bar utility.

Central Point's tech support was good. When I couldn't reach it on the first try, I left a message and received a prompt callback. The MacTools manual isn't up to the standard set by NUM's, but it's complete and more than adequate.

Comparing

BOTH PACKAGES PROVIDE USEFUL, effective tools for hard drive and floppy disk file recovery. Which package to buy depends on the utility software you have. The two packages use different methods to recover files and volumes, and sometimes one package works where the other fails. If you're a consultant or a corporate support specialist, you want all the firepower you can bring to bear on a crashed disk, and you should own both NUM and MacTools. For the individual Mac owner who wants only one package, my pick is MacTools, because of its automated hard drive and floppy disk repair capabilities, antivirus capabilities, and tighter focus on data protection.—TOM NEGRINO

Performance/040 (33MHz)

PROS: Easy-to-use software; compatible with all Mac II's; two-year warranty. **CONS:** Slow; not virtual memory-compatible; requires on-board RAM. **COMPANY:** Impulse Technology (404/889-8294). **REQUIRES:** Mac II with Rev. B ROM, IIx, IIcx, IIci, IIfx, IISI (with NuBus adapter board); 2MB of RAM for System 7; as much RAM (or more) on accelerator board as on system board; System 6.0.5. Recommended: 8MB of RAM on Performance/040. **LIST PRICE:** \$2399.



Radius Rocket 33

PROS: Fast; many software features; multiprocessing capability through optional software; a good value. **CONS:** Not virtual memory-compatible; requires on-board RAM; incompatible with IIfx and IISI. **COMPANY:** Radius (408/434-1010). **REQUIRES:** Mac II with Rev. B ROM, IIx, IIcx, IIci; 4MB of RAM; 4MB of RAM on Rocket; System 6.0.7. Recommended: 8MB of RAM on Rocket. **LIST PRICE:** \$2499.



TokaMac II FX 33

PROS: Excellent performance; doesn't require on-board RAM. **CONS:** Not virtual memory-compatible; expensive; works with only the Mac IIfx; installation requires shipping system board to vendor or paying \$2000 deposit. **COMPANY:** Fusion Data Systems (512/338-5326). **REQUIRES:** Mac IIfx; System 6.0.7. **LIST PRICE:** \$3995.



the SCSI option when it becomes available. (Radius promises Quadra, IIfx, and IISI support with version 2.0 of its software for the board.)

The Radius Rocket 33 is my board of choice, although it requires at least 4MB of its own RAM (you pop on the chips before installing the board). It has 8 SIMM slots for 16MB 80-nanosecond SIMMs, giving it space for up to 128MB of memory.

The Rocketware control panel is loaded with features such as a screen saver, screen capture, and large-type menu titles. Unfortunately, the software defaults to the board's slower write-through mode. I wish users could set the faster 68040-compatible copy-back mode as the default instead of having to set each application to 040 mode manually.

Radius is putting the finishing touches on an optional software add-on called RocketShare (under \$500) that divides processing tasks among two or more boards—the Rocket board, the system board, and any other Rockets you have installed. Radius says the speedy multiprocessing should work with any program that can work in the background under System 7, but its real advantage of multiprocessing is for high-resolution 32-bit color rendering and other high-end graphics tasks.

The 33MHz Rocket board had no software-compatibility problems with the Macworld Lab test suite, although the board is still incompatible with A/UX and virtual memory. But before you place your order, make sure you read Radius's compatibility guide. Some hardware, like the older RasterOps color boards and Macro-media MacRecorder, don't work with the Radius Rocket 33.

Similar to the Radius Rocket, the Impulse Performance/040 is also a NuBus-based accelerator that requires its own memory—8MB of RAM is recommended. The board comes with software that lets you choose cache settings. The

33MHz Performance/040, with new software and firmware, fixes most of the bugs and incompatibilities that I encountered when testing the 25MHz version a while back. (The 33MHz version still has some trouble with ACIUS's 4D, but a forthcoming software upgrade addresses that problem.) The performance of the board, however, is not up to par with the Rocket.

Even though the price was recently cut from \$3499 to \$2399, I do not recommend the Performance/040. It ran a lot slower than the other boards in most of the tests. It's even slower than the native CPU in disk-intensive tasks because it uses the system board as an intermediary for all I/O activity—now you know why Impulse ships the board with a RAM disk utility. (The utility can use the on-board RAM, but not the RAM on the system board.)

There's a hardware/software upgrade in the wings that Impulse claims will speed up the board considerably. I tried the beta software and noticed only minor improvement in most benchmarks. Until I have a chance to try the new hardware upgrade, I can't recommend this board. Besides the performance improvement, the product could use a better manual.

Installation of both the Performance/040 and the Rocket is very easy; you just load up the board with the RAM and then plug it into a NuBus slot. (Radius's clear instructions make it particularly simple.)

The Fusion Data Systems TokaMac II FX 33, which works only with the Mac IIfx, is a completely new design. The board plugs into two slots at once on the Mac IIfx—the PDS, or Processor Direct Slot (which provides faster access to the CPU's processor), and a nearby NuBus slot (for efficient NuBus data transfer). The TokaMac also sports a fast 128KB memory cache that speeds processing by minimizing the number of times the sys-

continues

THE 33MHZ 68040 ACCELERATOR boards reviewed here are all capable of outrunning the fastest 68030-based accelerator and, due to the software vendors' efforts to make their applications compatible with Apple's 040 models, most programs run without trouble on these boards.

If you have a IIci, IIcx, IIx, or II and crave some speed improvement, the 33MHz Radius Rocket accelerator is for you. The Rocket board performed well in Macworld Lab tests, except for video and Disk I/O, compared with the Quadra 950.

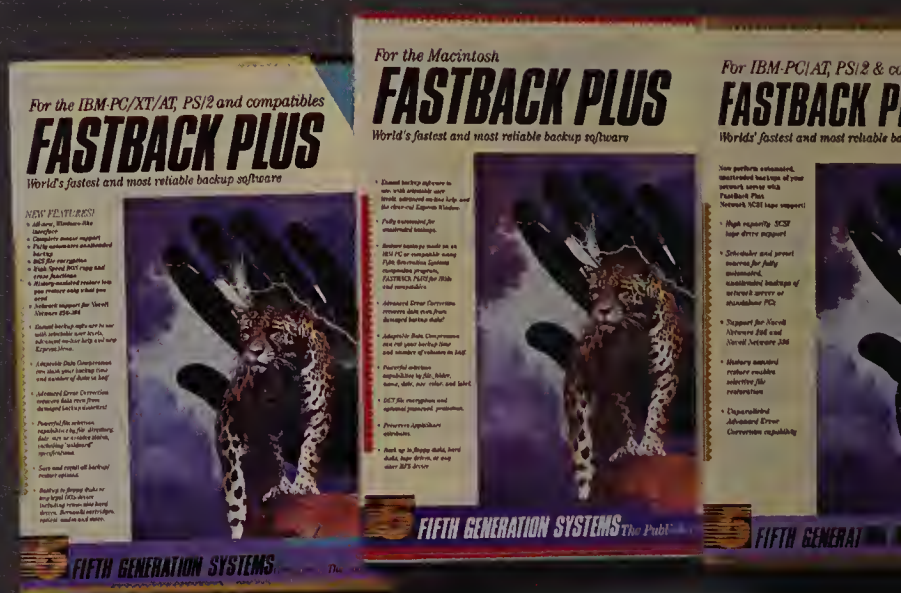
For performance on a par with the Macintosh Quadra 950, you need a video accelerator like the Spectrum/8 24 PDQ and the forthcoming SCSI accelerator piggyback board for the Radius Rocket (a \$299 option that will use the same SCSI chip as the Quadra 950). I recommended getting the Rocket board and

ACCELERATOR PERFORMANCE

Board	System	FPU Math	Processor	Disk I/O	Video
Quadra 950		0.88	0.82	1.00	1.00
TokaMac II FX 33	IIfx	1.00	1.00	0.85	0.68
Performance/040	IIfx	0.65	0.65	0.52	0.42
Macintosh IIfx		0.56	0.54	0.71	0.39
Radius Rocket 33	IIci	0.80	0.95	0.83	0.54
Performance/040	IIci	0.66	0.69	0.59	0.36
Macintosh IIci		0.28	0.28	0.53	0.40

This table compares the performance of three 33MHz 68040 accelerator boards. Macworld Lab conducted several tests in each category. The results have been combined and indexed so that each product's performance is equally weighted. As you can see, the TokaMac and Radius boards are the best at speeding up processor tasks, while the Quadra 950 excels in disk I/O and video performance. Higher numbers are better.

Backup. For people who don't.



Everyone who uses a Macintosh® ought to back up regularly. But most people don't back up at all.

In fact, if the people in your company are like those at most other companies, about the only way you're going to get regular backups out of them is to do it without them.

Guess what?

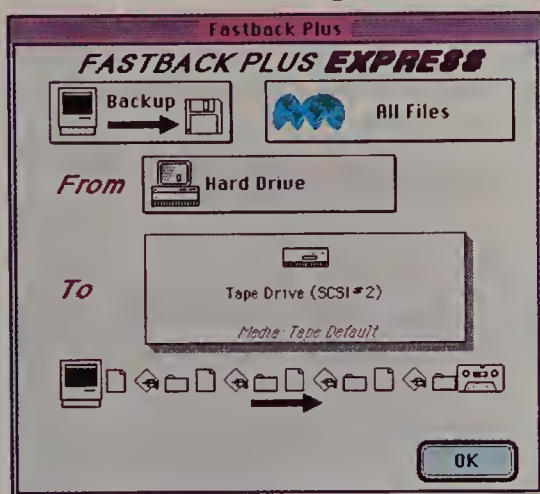
Now you can.

Now you can set up fully automatic, unattended backups for every Mac in the house.

Not to mention every DOS® and Windows®-based PC and Novell® network server.

What's more, you can easily customize the nature and timing of each one to

The Macintosh version of the world's most popular backup software is also the Mac world's most flexible backup software.



If automated, unattended backups aren't your style, you can still enjoy unprecedented convenience with our Express Menu, which lets you perform a full backup with a couple of clicks of your mouse.

Along with being System 7 savvy—which means you get to enjoy Balloon Help and other wonderful things—Version 2.6 lets you back up to just about anything you can think of, from floppies and hard disks to direct access and streaming tape drives and any HFS device.

It also lets you back up in the background while you're using an application or two in the foreground.

It even formats floppies on the fly, so you don't have to bother.

And it comes complete with our unique Macro Editor.

What, you ask, makes our Macro Editor unique?

It uses plain English commands. Which means you can actually use it.

Using the Mac version of Fastback Plus is a lot like using the DOS version, the Windows version and the Network version—same look, same functionality.

Same backups, even.

That's right. You can actually restore a Mac file directly onto a PC, and vice versa.

Nobody else can do that.

But then, nobody else can back up 1MB per minute on a Mac.

No other DOS, Windows or Network backup program can run fast enough to see our tail lights.

And no other backup software is backed up by our

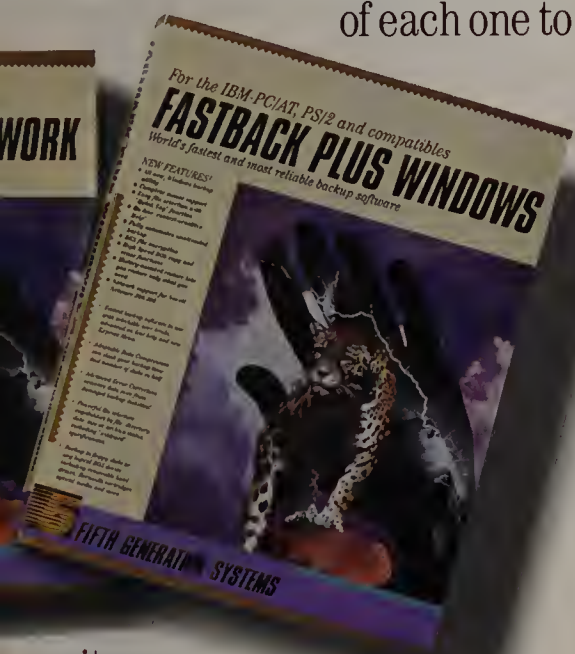
In addition to floppies, hard disks and other HFS devices, Fastback Plus for the Macintosh lets you back up to direct access and streaming tape drives.



vaunted 24-hour toll-free technical support. And our one-year money-back guarantee.

There's more. So pick up the phone. Dial 1-800-477-8212.

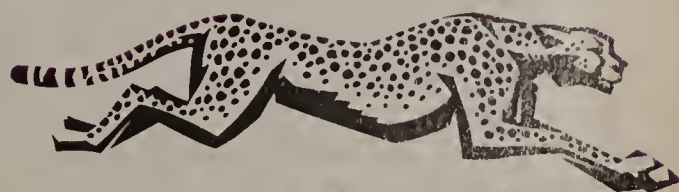
And tell everyone to stand back.



suit your requirements.

And transform a simple, effective company-wide backup policy from fantasy into fact.

All you need is Fastback Plus.



FIFTH GENERATION SYSTEMS, INC

tem board memory must be accessed. Unlike the two other boards, the TokaMac takes full advantage of system board memory—the TokaMac doesn't require any memory of its own. (The board handles older software that has trouble running in 040 copy-back mode with a control panel that lets you switch to write-through mode.)

The test results show that the board was faster than the Quadra 950 in most CPU and FPU tasks. The Quadra 950 edged out the TokaMac in both video and disk-intensive tasks because it has a built-in video accelerator and support for faster SCSI I/O. But you should be able to exceed video performance on the Quadra 950 by coupling the TokaMac with a video accelerator board that supports block-transfer mode. The TokaMac board has custom chips designed to speed up data transfer to other NuBus slots and free up the 040 processor as quickly as possible. (Fusion Data is still trying to fine-tune the board's software to work efficiently with SCSI accelerator boards such as the PLI QuickSCSI.)

To accommodate the TokaMac's unique design, the system board must be fitted with a new chip, which is why you have to send the system board to Fusion Data Systems (the company promises a one-day turnaround) or pay a \$2000 deposit for a new system board (you get the \$2000 back when you turn in your original system board). Installation is straightforward, with one thing to watch for: you must very carefully align the board with both the NuBus and PDS slots before seating the board, unless you want a chance to practice your needle-nose pliers technique.

The only problem I encountered with the TokaMac was an occasional divided-by-zero error during restart. Fusion Data Systems acknowledges the problem and says the company is working on a fix.

With a price tag of \$3995, the TokaMac board is the most expensive accelerator board available today. If I owned a Macintosh IIfx with a plain video board and desperately needed the performance and functionality of a Quadra 950, I would first consider selling the IIfx to trade up to a 950, which has built-in video acceleration and much faster SCSI performance—not to mention the fact that it has Ethernet, a hefty power supply, and room for additional internal hard drives; has conventional SIMM's; and when necessary, runs virtual memory. If you already have a loaded Mac IIfx with a fast video board and more than enough memory, however, the TokaMac II FX 33 might make good sense as a route to speed.—MARK HURLLOW

Color Ink-Jet Printer

HP PaintJet XL300

PROS: Prints tabloid-size images; high resolution (300 dpi); good Pantone color simulation. **CONS:**

Poor documentation; noisy. **COMPANY:**

Hewlett-Packard (800/752-0900; 800/387-3867 in Canada). **REQUIRES:** Mac Plus; System 6.0.5.

LIST PRICE: \$3495.



HEWLETT-PACKARD'S PAINTJET XL300 is a color ink-jet printer that prints at a resolution of 300 dots per inch. It handles letter, legal, and tabloid paper sizes. While the XL300's output will not satisfy demanding graphic arts professionals looking for a color-proofing device, business users interested in punching up their presentations with color should be quite happy with the printer.

The XL300 is based on an Intel 80960 RISC processor and comes with an AppleTalk network connection and a Centronics parallel port for DOS PCs. The printer switches automatically between the two ports, so it can be shared on a mixed Mac and DOS PC network. For PC users, the printer contains HP's LaserJet-compatible PCL 5C printer language. The HP PaintJet XL300 replaces the discontinued HP PaintJet XL as the tabloid-size unit in HP's line of color printers.

The printer comes with 2MB of RAM. There are also two RAM slots, and you can add more RAM on SIMMs to bring the XL300 to a maximum of 18MB of RAM. In my tests, the standard 2MB of RAM worked fine, handling all of the test documents with no "out of memory" messages. HP tech support indicated that the extra RAM capacity was chiefly useful for DOS PC users and for people who have the PostScript option board installed in the XL300.

Setup was easy. Installation of the four ink cartridges (cyan, magenta, yellow, and black) was fast and clean, with none of the drips and mess associated with loading some color ink-jets. HP provides a software installer, and the print driver is available in the Chooser. The driver is based on QuickDraw, and is compatible with Adobe Type Manager (ATM).

After selecting the print driver, you print by selecting Print from any application. A Print dialog option allows you to adjust the colors printed in two main ways: by attempting to match printed colors to the screen, or by using Pantone color simulations. To attempt to match screen color, you first use a pop-up menu to tell the driver which monitor you're using.

The choices are limited to Apple 12", Apple 13", SuperMac 19", RasterOps 19", Radius 19", and Other. If your monitor is not listed in the pop-up, HP tech support suggests that you use the Other setting, or call for more assistance. Once the monitor is set, you can pick from two choices: Match to Screen and More Vivid Than Screen. The first choice attempts to replicate the color balance of your monitor; the second uses your monitor's color balance as a starting point, then increases the saturation of the printed output for more snap in the colors. You can also select one of three dither patterns. I found that the default dither pattern, Cluster, worked best in my tests.

The XL300 print driver also has a setting to print Pantone colors, which are an industry-standard color-swatch system used as a reference by printshops, designers, and other graphics professionals.

To test the fidelity of the Pantone colors, I printed test pages containing Pantone color swatches from Aldus PageMaker 4.2a and Adobe Photoshop, then compared the test sheets to the Pantone Color Formula Guide 747XR (provided with the printer). Printing Pantone colors requires that you use HP's CX JetSeries coated paper. The results were good. Because the XL300 prints halftone patterns, rather than continuous tones, the printed colors can only simulate the true Pantone colors, rather than match them exactly. But the simulations are quite good.

Results on other test images were mixed. Color photographs scanned into Photoshop, then printed, fared the worst. Lighter colors tended to look muddy and dull. Images created on the Mac, such as PICT graphics, printed well, with vivid colors and crisp, sharp edges. TrueType and PostScript text (using ATM) also printed cleanly. Bar graphs and bullet charts from Aldus Persuasion, and other pages where the color was used for accent, generally looked good. Transparencies looked fine, with smooth, consistent ink density and detailed edges.

The documentation is a mixed bag; designed to serve Macintosh, Windows, and DOS users of the printer, it provides some generic information but falls down on specifics. The *User's Guide* has no detailed information describing the print driver's color options; you are left on your own to see what results the different settings produce.

Aside from the incomplete documentation, the XL300 is somewhat noisy, with a fairly loud fan. It makes the strangest clunking noises when beginning to print; it sounds as though the printer has slammed the ink carriage against its stop, *continues*

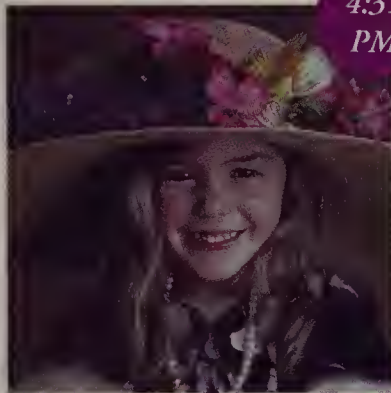
Efi

4:30
PM



"Scanned in
too light"

4:31
PM



"Too blue,
use the
color filter"

4:33
PM



"No color,
pump up the
saturation"

4:42
PM



"Perfect.
Great proof.
Print it."

CachetTM
Color Editor



WHATEVER THE MONITOR.
WHATEVER THE IMAGE. FOR
THE FIRST TIME EVER YOUR
DESKTOP COLOR PROOF WILL
MATCH YOUR FINAL PRINT.

EFI'S **CACHET COLOR EDITOR**
PROMISES YOU PERFECT COLOR
IN MINUTES!

INTRODUCTORY PRICE, \$395.

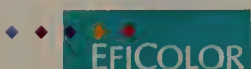
COLOR DESKTOP PUBLISHING
WILL NEVER BE THE SAME.

*Finally. Professional desktop color for the
first time ever. Intuitive. Powerful.
Expert color editing and separations.
Early proofs. Make deadlines.
Make dinner on time.*

Call 1-800-285-4565
to order Cachet or ask for your
FREE DEMO DISK.

See us at Seybold, Booth # 612

Cachet system requirements: Mac LC with math coprocessor,
Mac II or Quadra family. Hard disk, 5MB RAM (8MB
recommended). 8 to 24-bit video card. Color monitor, 13" or
larger. System 6.05 or later. This ad was produced using Cachet.



Cachet includes EfiColor™
Color Management System



Circle 22 on reader service card

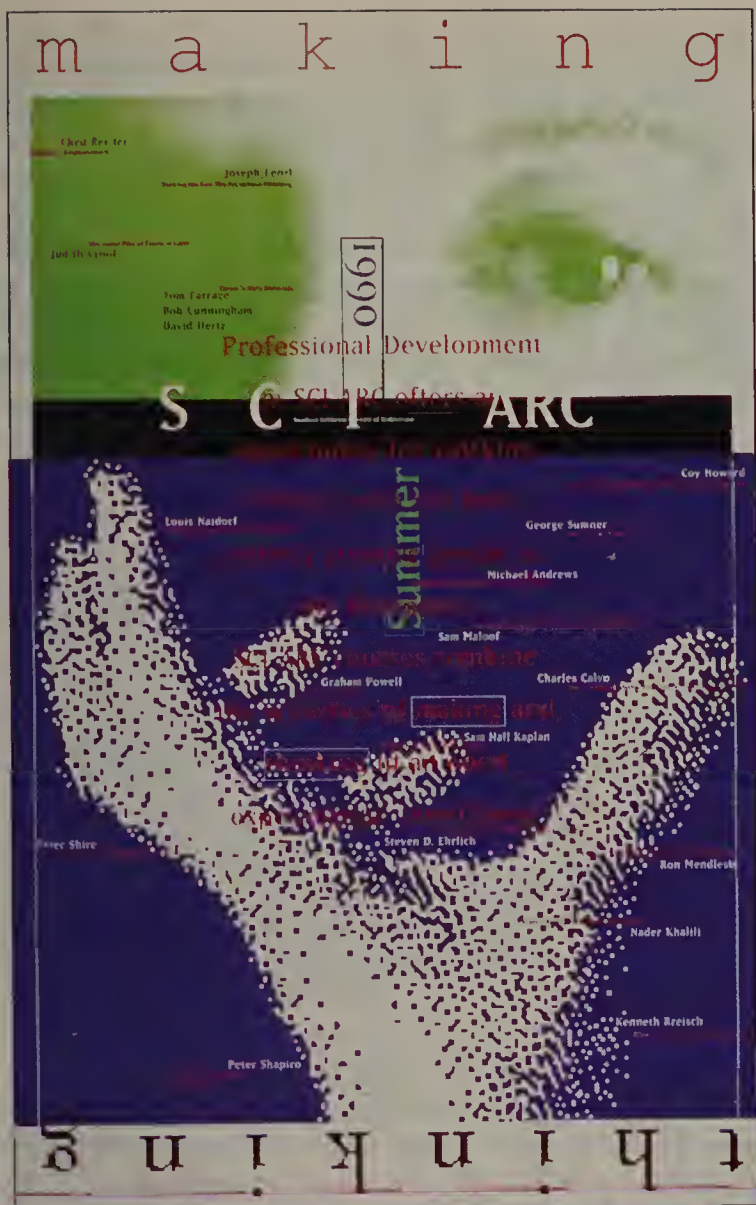
e"e

Centuries before
cosmetics,
the tribesmen of
New Guinea
had their own idea
of the mud pack.

**DESIGNERS LOVE ALDUS PAGEMAKER.
YOU CAN SEE IT IN THEIR FACES.**

THE ONLY THING
PRIMITIVE *about*
AFRICAN
ART
is OUR UNDER-
STANDING *of it.*

(di-zin'



Experts' Opinions

Designers of all types count on the power of Aldus® PageMaker®. Take our latest version — PageMaker 4.2 for the Macintosh. It now includes a



Control palette that lets you position, move and resize elements with numerical accuracy. Plus it has nudge buttons for precise adjustments.

You also get exact and accurate typographic track kerning. In fact, PageMaker now allows you to kern type to an impressive 0.01 of an em space.

Sean Adams, the Design Director of April Greiman, Inc. puts it this way: "We come from a metal type background, and our standards are exceedingly high. With PageMaker, we are able to achieve the aesthetic and technical precision we demand of type."

Call 1-800-685-4163 for a product brochure. And discover the type of quality you can expect from Aldus PageMaker.

COOPHIMMELBLAU

THE ART OF POWERFUL IDEAS™



then the printer goes completely silent for a few seconds, then it starts to print. These noises are a bit disconcerting, but I eventually got used to them.

The XL300 is a good printer, well worth considering if you're in the market for color in business presentations. It is also appropriate for desktop publishers using spot color. People who need to do process color for photographs are probably best served by a thermal-wax or dye-sublimation printer, however. Tabloid-paper capability is unusual in this printer's price range, and makes the XL300 a good value.—TOM NEGRINO

File-Transfer Utilities

AccessPC 2.0

PROS: Supports multiple types of DOS media; can be set to identify PC files by extension. **CONS:** Does not let users define DOS file name for copied Mac files. **COMPANY:** Insignia Solutions (415/694-7600). **REQUIRES:** Mac Plus; SuperDrive or compatible high-density floppy drive; System 6.0.5. **LIST PRICE:** \$99.95.



DOS Mounter 3.0

PROS: Supports DOS wild cards in extension mapping. **CONS:** Runs more slowly than other file-exchange programs. **COMPANY:** Dayna Communications (801/531-0600). **REQUIRES:** Mac Plus; SuperDrive or compatible high-density floppy drive; System 6.0.5. **LIST PRICE:** \$89.95.



Macintosh PC Exchange 1.01

PROS: Can be set to identify files by DOS extension. **CONS:** Does not let users define DOS file name for copied Mac files. **COMPANY:** Apple Computer (408/996-1010). **REQUIRES:** Mac Plus; 3MB of RAM; SuperDrive or compatible high-density floppy drive; System 7.0. **LIST PRICE:** \$79.



WITH APPLE'S AGGRESSIVE POSITIONING of its product line as corporate computers that support the DOS standards as well as the Macintosh approach to computing (for example, Apple markets its PowerBooks as DOS-capable computers), you might think that Apple's solution to Mac-DOS file sharing would be innovative, maybe even trend-setting. You'd be wrong. Apple's new Macintosh PC Exchange, a \$79 control panel, is adequate but hardly the state of the art in cross-platform file sharing.

Like Insignia Solutions' \$99.95 AccessPC, Dayna Communications' \$89.95 DOS Mounter, and Outbound Systems' DOS.INI (bundled with its Mac-compatible notebooks), Macintosh PC Exchange lets you put DOS 720K or 1.4MB 3.5-inch disks into a SuperDrive and instructs the Mac on how to read and write to these disks and how to translate DOS directories into Mac folders, so Mac users can manipulate DOS files using a familiar metaphor. But Macintosh PC Exchange's main competitors—AccessPC and DOS Mounter—are better products that cost only a little more.

All these programs let you map DOS file extensions (the three letters after the period in a DOS file name, used to identify the file type) to Mac applications and file type. Thus, for Macintosh Microsoft Word 4.0 you can associate the WDBN file type with DOS files that have the extension .DOC, and you can have the Mac launch Microsoft Word 4.0 when you double-click on such files. (On the Mac you see the Word icon for this file rather than the usual DOS text icon.) This feature is handy if you use applications that are file-compatible across Mac and DOS/Windows versions. (Such applications include Word, Microsoft Excel, Lotus 1-2-3, Frame Technology's FrameMaker, Aldus PageMaker, Ventura Publisher, Aldus FreeHand, Adobe Illustrator, and Intuit Quicken.) Other file-transfer programs offer file-extension mapping, although the interface on Macintosh PC Exchange is slightly simpler.

But none of the three programs take the next logical step: giving (or prompting the user to give) DOS file names and adding the appropriate extension when copying Mac files to a DOS disk. The programs seem to treat file transfer as something that happens mainly from DOS to Mac, a bit of unhelpful Mac chauvinism. You end up with arcane names like *9&.9CO* (for what had been called *9.9 Color Monitors*) and *WORKSHE&.* (for what had been called *Worksheet1*). The program should automatically name the files something like *99COLORM.DOC* and *WORKSHEE.XLS*, respectively.

Pacific Microelectronics' \$249 Mac-In-DOS 2.0 for Windows and \$199 Mac-In-DOS 2.0 for DOS, which do for DOS users what AccessPC and the like do for Macintosh users—do give you the option to rename files during transfers. But they have no file-extension-mapping features to assign the right Mac resources to a DOS file or the right DOS file extension to a transferred Mac file.

Neither AccessPC nor Macintosh PC Exchange understands wild cards in DOS file names. For example, in DOS the ex-

tension .PM* means any extension beginning with PM, which for PageMaker users would cover the .PM3 extension for Version 3 and the .PM4 extension for Version 4; for 1-2-3 users, .WK* would cover the .WKS, .WK1, and .WK3 extensions (again, for different versions). Letting users specify wild cards would reduce the number of extension assignments, as well as help ensure that appropriate assignments would not be forgotten. DOS Mounter supports wild cards.

Ideally, file exchange should be easy in both directions, and each platform's conventions should be respected. That has yet to happen with these three programs or with DOS programs.

Copying, opening, and deleting files seems slow under the file-exchange programs—my tests showed that they run at 40 to 80 percent of the speed of normal Mac-disk operations. This is due to the overhead in translating between Mac-disk format and DOS format. DOS Mounter was significantly slower in my tests, taking up to twice as long as did AccessPC or Macintosh PC Exchange.

Unlike the others, Macintosh PC Exchange is further limited by running only under System 7 and by supporting only 3.5-inch floppies. AccessPC and DOS Mounter also work under System 6; and they support DOS-formatted, SCSI-based removable media such as flopticals, SyQuest cartridges, and Bernoulli cartridges, as well as drives that read 5.25-inch DOS floppy disks. Apple erroneously seems to think that only people with floppy disks and System 7 need file-exchange solutions. In contrast, AccessPC's control over formatting various DOS media is slick—its MediaFormatter and MultiDriver utilities even know about the removable-hard-drive formatting requirements for different versions of DOS.

When transferring files, Macintosh PC Exchange creates two directories on DOS disks—one for the Trash, the other for the Macintosh file's resource fork—so Macintosh PC Exchange can remember the original Mac file name and type even after copying the file to the DOS disk. (If you move a file to a DOS PC, work on it, and move it back, the Mac will know what icon and application to associate with the modified file. This is not as helpful as it might seem, since chances are you've renamed the file with a more DOS-like name, so the Mac will not know to apply these resources to the renamed file.)

These resource files show up on your DOS disk when loaded into a DOS computer but cause no harm other than taking some disk space. You can delete them anytime without causing Macintosh PC

continues

It's About Speed. It's About Resolution.



Accel-a-Writer 8000



Accel-a-Writer 4000

It's About Time.

Finally. You have a choice. High resolution, PostScript® compatible printers that deliver speed and flexibility like you've never seen.

It's about Speed. Both printers provide 8 MB RAM (expandable to 16 MB), an AMD 29000 RISC processor and Xante's *Advanced Memory Management* to break through the bottlenecks typically found on PostScript printers.

It's about Resolution. There is no substitute for true 600 x 600 dpi. Both printers provide high quality, consistent output without the side effects of artificial smoothing. Your scanned and other gray scale images will dramatically improve with Xante's *Advanced Gray Scale Technology*—you'll get 850 x 850 dpi equivalent gray scales.

It's about Flexibility. In addition to the standard 35 fonts, Xante's *Virtual Disk Technology* enables you to load and reload up to 30 of your download fonts permanently on the printer. If you need to store more than 30 fonts, you can attach a disk to the SCSI interface.



It's about Peace of Mind. Xante's *Quality Assurance Guarantee* protects your investment. If within 30 days of purchase you are not completely satisfied, you can return it and be fully refunded. You are also provided with a one year warranty on all parts and labor.

It's about Value. The *Accel-a-Writer 4000* and *Accel-a-Writer 8000* are amazingly affordable. And you can further reduce the cost by sharing among Mac® and PC users with simultaneously active Serial, Parallel, and AppleTalk® interfaces.

It's about Time. Finally. Everything you need in a printer, at a price you can afford, and with the purchase protection you deserve. Compare our printers to any other printer and we think you'll agree.

	Accel-a-Writer 8000	Accel-a-Writer 4000	Apple® IIG
True 600x600 dpi	✕	✕	
Gray Scale 850x850 dpi	✕	✕	
Virtual Disk Technology	✕	✕	
RISC Processor	✕	✕	
Pages Per Minute	8	4	8
Standard RAM	8 MB	8 MB	5 MB
Upgrade controllers are available to give full Accel-a-Writer functionality to LaserJet® & LaserWriter® printers.			

1-800-926-8839

Fax 205-476-9421



XANTE

Innovations In Output



Exchange a problem (although it will create new resource files if you put the DOS disk back in the Mac).

AccessPC offers resource-file copying as an option, although the files are invisible to DOS users. DOS Mounter copies resource files automatically, as does Macintosh PC Exchange, but these files are invisible to DOS users.

Any of these programs is fine for basic file transfer, although anyone dealing with multiple media should forgo Macintosh PC Exchange in favor of AccessPC or DOS Mounter. AccessPC is the best choice if you deal with several types of DOS media; choose DOS Mounter if you need wild cards in extension mapping. If you rarely do file transfers with DOS users, stick with Apple File Exchange, which comes with the Mac's system software.

But if you work in a multiplatform environment, where data moves both ways, get a product like DataViz's MacLinkPlus/PC (see *Reviews*, *Macworld*, March 1992), which combines file transfer and file translation. This \$199 program (which includes the DOS Mounter software) translates formats while copying files back and forth and lets you give usable names to the Mac files you copy to a DOS disk.—GALEN GRUMAN

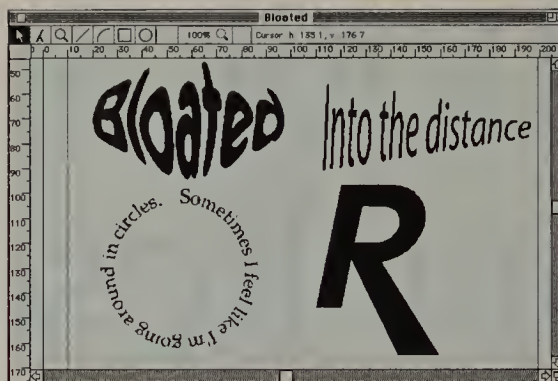
Type-Manipulation Program

LetraStudio 2.0

PROS: Compatible with all major font formats; faster than previous version; many new effects; new dialog boxes allow for precise positioning and resizing; reduced price. **CONS:** No built-in text-styling effects; text can't have graduated fills; no publish-and-subscribe support. **COMPANY:** Letraset USA (201/845-6100). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive. Recommended: 4MB of RAM for Mac LC, Mac II, or Quadra. **LIST PRICE:** \$249.



DISPLAY TYPE IS ONE OF THE MOST demanding forms of typography. The type in product labels, magazine and poster headlines, logos, and the like not only must be precisely spaced, it also is often stretched, rotated, attached to a curving baseline, or otherwise contorted. The typographic features in a desktop publishing program can't begin to meet those demands. Even illustration programs like Adobe Illustrator and Aldus FreeHand fall short—they don't let you drag individual characters to control spacing, for example. For serious display-type work, there's no substitute for a dedicated display-type program like LetraStudio.



The Envelope, Please A sampling of LetraStudio effects. Text shaped within envelopes, top; text attached to a circular baseline, bottom left; a character reshaped using Bézier control points, bottom right.

LetraStudio has been around for several years, but early versions were flawed. With version 2.0, the program has hit its stride, although it still lacks some of the flashy features of its major competitor, Brøderbund Software's TypeStyler.

Version 2.0 supports all major outline-font formats—PostScript Type 1 (including Adobe Multiple Master), PostScript Type 3, and Apple's TrueType. (In a related development, Letraset has recently converted its library of display typefaces into Type 1 and TrueType formats. Each Letraset Fontek package includes a given font in both formats.)

LetraStudio's operating style has always been straightforward: click on the text tool, choose a font, and type the text. Unlike TypeStyler, LetraStudio lets you type and edit text directly in the drawing area—no separate dialog box.

Better still, LetraStudio lets you adjust character spacing by clicking and dragging individual characters. It's the most logical way to adjust spacing, and a vast improvement over the tendon-taxing keyboard kerning commands that illustration and publishing programs provide. Similar techniques let you slant or resize characters and move them up and down relative to the baseline.

LetraStudio provides two basic mechanisms for stretching and reshaping a block of text: you can reshape the baseline, making it wavy or even circular; and you can apply an *envelope*—a shape that LetraStudio reshapes text to fit within. The program provides more than a dozen preset envelope shapes that simulate a fish-eye lens, create a perspective effect, and more. You can reshape a baseline or an envelope using selection handles; with version 2.0, you can also use Bézier controls. Another new feature: you can copy effects that have been applied to one element and apply them to another.

Its mouse-oriented style has always been one of LetraStudio's strengths, but 2.0 adds commands that let you type precise values. The Object Specs command

lets you specify an object's location and size. (Oddly, though, the dialog box's Cancel button is the default—the one chosen when you press the return key.) The Align dialog box lets you align selected objects to each other (and this time, the OK button is the default). Several new keyboard shortcuts let you nudge objects and adjust character spacing in increments as small as 1/10 point.

You can save completed display type in encapsulated PostScript, PICT, and Adobe Illustrator 1.1 formats. Unlike its predecessors, LetraStudio 2.0 can also import Illustrator 1.1 and Illustrator 88 line art. LetraStudio 2.0 also lets you convert text into a graphic. Convert a single character to a graphic and then choose Ungroup, and you can reshape the character by dragging its Bézier control points.

No matter how you contort text, all of LetraStudio's text-editing and spacing controls are still available. (One exception: you can't edit text that you've converted to a graphic.) Watching text reflow within a circle as you type or dragging characters along a roller-coaster baseline can be a real thrill.

It can also be slow. LetraStudio 2.0 is faster than earlier versions, and it has a variety of display preferences that let you speed up screen redraws at the expense of on-screen text quality. Still, complex documents demand a fast Mac with at least 5MB of RAM. Even then, this program isn't going to get any speeding tickets.

How does LetraStudio 2.0 compare with TypeStyler 2.0 in other areas? LetraStudio lets you assign colors using the industry-standard Pantone Matching System; TypeStyler 2.0 doesn't. LetraStudio can have numerous documents open simultaneously; TypeStyler supports just one. But TypeStyler provides a wonderful selection of canned (and customizable) text effects—gradient fills, drop shadows, and so on—that LetraStudio lacks. Indeed, LetraStudio can't apply a gradient fill to characters at all. TypeStyler also provides a tool for creating commonly used graphic shapes such as starbursts and diamonds; in LetraStudio, creating shapes other than rectangles and circles requires extra effort. And TypeStyler supports System 7's publish and subscribe features; LetraStudio 2.0 doesn't, although it does run fine under System 7.

In the end, LetraStudio provides superior features for manipulating characters, while TypeStyler provides a larger gallery of flashy effects. The program you choose may depend on the kinds of display type you create. If you're after precise, intuitive control over character spacing and shape, LetraStudio is the better program.—JIM HEID

There Are Better Things To Do With Your Old LaserWriter



Turn It Into A Lightning Fast, 600 dpi SuperPrinter.

Does it seem like your old LaserWriter® has lost its usefulness as the state-of-the-art laser printer you originally purchased it for? Don't let your current investment go to waste!

Upgrade with the *Accel-a-Writer* and bring new industry leading technology to your old Apple® LaserWriter or HP® LaserJet®. Print speedy, high resolution graphics without the expense of buying a brand new printer!

True 600 x 600 dpi Text and Line Art. Produce near-typeset quality output that is clearly suitable for camera-ready reproduction.

850 x 850 dpi equivalent gray scales. Now you can print smooth and detailed gray scale images. For example, you will now receive 197 levels of gray at an equivalent 60 line screen instead of the 25 available at 300 dpi.

Permanent Font Storage.

In addition to the 35 resident fonts, Xante's own *Virtual Disk Technology* allows you to permanently store up to 30 more download fonts directly on the controller. You will also be able to change the fonts stored depending upon specific job requirements. For those of you who want to store more than 30 fonts,

the *Accel-a-Writer* also includes a SCSI port for an external hard drive.

Lightning Fast Speed. Print your documents up to 12 times faster with the *Accel-a-Writer's* AMD 29000 RISC processor. *Advanced Memory Management* and *Dual Page Processing* will also speed up your printing by allowing one page to be built while another is being printed.

Simultaneous Mac®/PC Printing. *ISI* (Intelligent Simultaneous Interfacing) allows you to print from Macintosh® and PC/compatibles at the same time, without having to use manual switches or software commands.

Quality Assurance Guarantee. Xante offers a full, unconditional 30 day money back guarantee along with a 2 year warranty! Put your old LaserWriter to use—as a lightning fast, 600 x 600 dpi SuperPrinter today.



	Accel-a-Writer	Apple LaserWriters	HP LaserJets
PostScript® Compatible	✖	✓	
True 600x600 dpi	✖		
850x850 dpi Equivalent Gray Scale	✖		
Virtual Disk Technology	✖		
RISC Processor	✖	✓ NTR	✓ IIIsi
Standard 6MB RAM	✖		
Simultaneous Interfacing (AppleTalk®, serial, parallel)	✖		

Ask About The *Accel-a-Writer 8000* Laser Printer!

1-800-926-8839

Fax 205-476-9421



© 1992 XANTE Corporation. XANTE *Accel-a-Writer* is a trademark of Xante Corporation. Other brands and product names are trademarks or registered trademarks of their respective holders. XANTE Corporation: 2559 Emogene St., Mobile, AL 36606, Post Office Box 16526, Mobile AL 36616-0526 USA, Tel. 205-476-8189.



Circle 1 on reader service card

"It's not wizardry that sets us apart, it's Knowledge."



Agent DA

Team Building Technologies 7 An elegant, intuitive and flexible scheduling window for time management, scheduling, project planning. A RAM-based desk accessory with extremely small memory use, its powerful integrated alarms work even when DA is closed! For the entire family of Macintosh computers, including PowerBooks.

\$82



Network Management System

Dayna 7 Monitors the entire network for changes in the status of key AppleTalk network devices such as file servers, routers, printers and network modems, as well as traffic on local and remote segments of AppleTalk internetworks.

\$788



MacTRAC 2.0 (ADB)

MicroSpeed 7 Comes with MicroSpeed Control Panel software. Up to 8 command key assignments for menu shortcuts. Use the Edit feature to create custom key assignments. Adjust tracking speed and double-click speed. Three-button flexibility accommodates right- or left-hand use.

\$74



PowerMerge

Leader Technologies 7 Finally, a simple and automatic way to keep track of the latest version of your files when you use a PowerBook and a desktop Mac! Select an unlimited number of files, folders, or disks to be maintained and synchronized. Conflict notification if changes have been made to files on both Macs since updating.

\$82



Shortlist

Brainchild 7 Combines the features of multiple productivity tools into one remarkably easy-to-use program! Time-management, phone dialing, mail-merging, and much more. Your data becomes more useful and accessible. Power-saving features allow 50% longer battery life - perfect for all Macs, including PowerBooks!

\$98



Effects Specialist/Layouts

Postcraft 7 Effects Specialist transforms bitmapped and PostScript fonts into sparkling headlines or eye-catching logos. Offers kerning and 120 different effects. Two different **Layouts** packages (PageMaker or XPress) each offer over 200 DTP sample templates for ready-made solutions to typical business publishing problems.

\$78/98

ORDER INFO

Mac's Policies

- Visa, Mastercard, American Express, and DPTIMA gladly accepted.
- Your credit card is never charged until your products ship.
- Shipping rate is \$3 per order. When a partial order is shipped, we pay freight on additional shipments. (U.S. Only)
- Most personal and company checks approved upon receipt to insure immediate shipment. For non-standard checks and checks over \$1,000, allow ten working days for clearance.
- No sales tax (except WA residents add B.2%, OH residents, add 6%, to total, including shipping).
- All returns must have an authorization number. Please call 800-367-4222.
- All prices & promotions subject to change without notice. All items subject to availability. Not responsible for typographic errors

Product Guarantees:

- Most items carry the manufacturer's 30 or 60 day Money Back Guarantee (MBG). Mac's Place has a 30 day MBG on most hardware (USA only). We

maintain the right to limit quantities on MBG returns. Ask for details when ordering.

- 120 day limited warranty on all products, some hardware items carry one and two year warranties. Defective software is replaced immediately with like item(s). Defective hardware items repaired or replaced at our discretion.

Orders USA: Orders placed weekdays by 10:00 pm P.S.T., 1:00 am E.S.T. for "in stock" items ship same day (barring system failure, etc.) for overnight delivery via Airborne Express. Our \$3.00 shipping charge per order (USA ONLY) includes insurance at no extra charge. Rural locations may require an additional day for delivery. Areas not serviced by Airborne (Airborne does not deliver to P.O. Boxes) will be sent via U.S. Priority Mail.

Purchase Orders: Government, school, and institutional P.O.'s clear immediately. Corporate PO's subject to credit approval. P.O. orders are \$3 shipping rate per order.

International Orders: Call 206-883-8312. We ship throughout the free world via Airborne Express International. INTERNATIONAL ORDERS ARE CHARGED FULL SHIPPING CHARGES. Contact Mac's Place for information. Mail, FAX or electronic orders gladly accepted.

Electronic Mail Orders: Compuserve (76635.660); GENie (MACSPACE); America Online (Mac's Place). Mac's Place uses CE Software's QuickMail™ to check our mail regularly.

Phone: 800-367-4222, 206-883-8312, FAX 206-881-3090

Like all aspects of Mac's Place's operation, this ad was entirely designed and assembled using Macintosh technology. No paste-up. No stripping. No Kidding. © 1992 Mac's Place, Inc. Mac's Place and the Mac's Place logo are trademarks or registered trademarks of Mac's Place, Inc. All other marks remain the property of their respective companies.

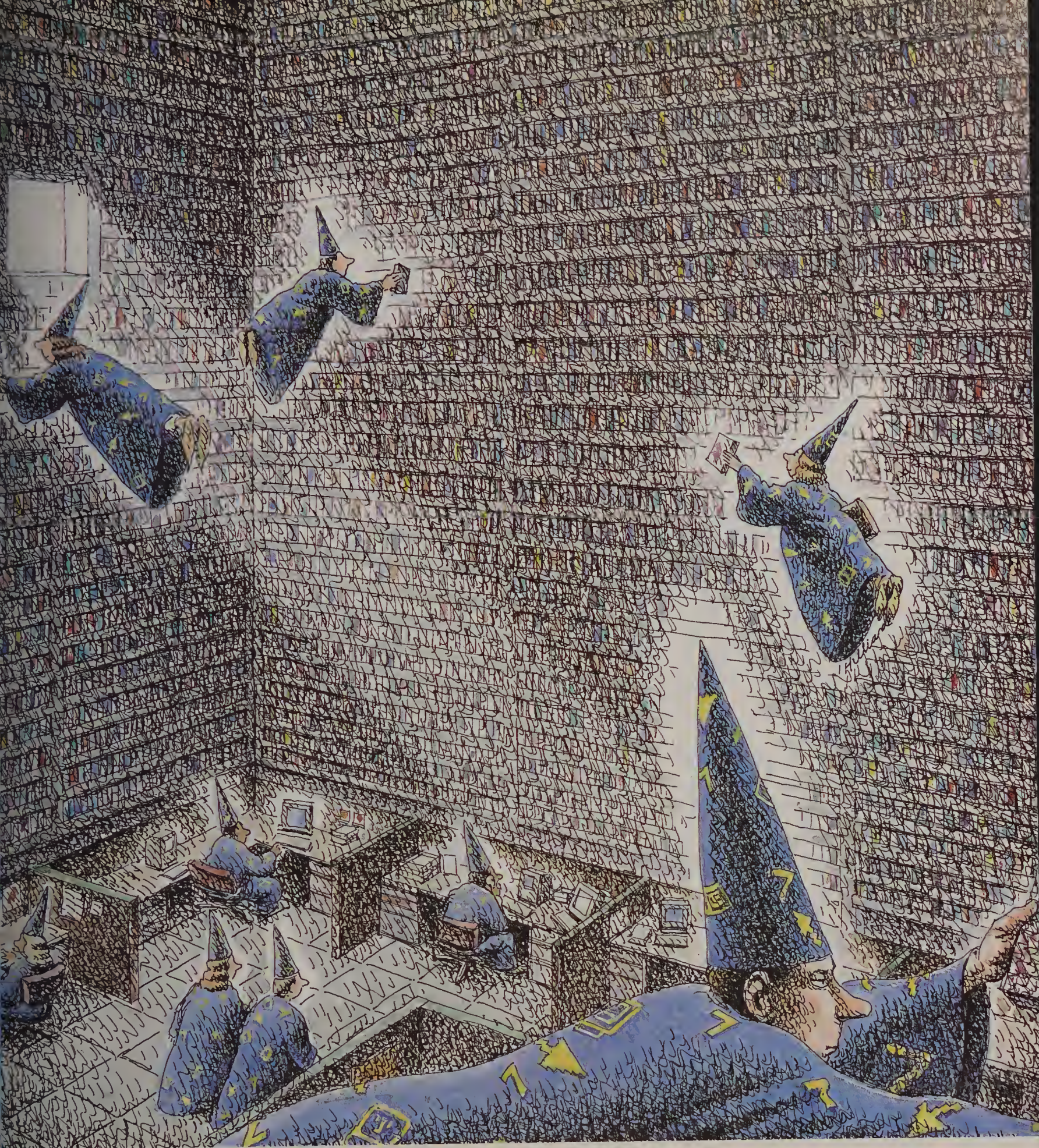
Mac's Place: 8461 154th Ave. NE, Redmond, WA 98052

Mac's Place

Call 1-800-367-4222 or Fax your P.O. 1-206-881-3090

7 System 7 Compatible • 30-60 Day Money Back Guarantee

"Our service will



Wizards are working at Mac's Place.

How else can you explain the wise answers you get to your questions? The software information the Mac's Place people always have at their fingertips? The calm, reassuring voices on the other end of the phone? It's really no surprise some people feel that way. But the real reason is that we're the only major mail order company that's *Mac compatible**. That means we know more about Mac products—including System 7 compatible products—than anyone else. So we can answer your questions better than anyone else and make sure you get the products that are right for you. Try us. It isn't wizardry that sets us apart. It's knowledge.

Mac's PlaceTM

Our Hours: Monday through Friday 6AM-10PM PST and Sat/Sun 6AM-6PM PST Call **1-800-367-4222** US & Canada

*Macintosh Compatible means we run our company completely on Macs. Everyone has at least one Mac IIcx on their desk, equipped with 8 megs RAM, 40-MEG Hard Drive, 14" color monitor, connected via our Ethernet network to our custom-programmed database. The database literally runs all phases of our operation — product information, order taking, order processing, inventory control, accounting, purchasing, customer service, technical support. All of us also have complete desktop communications, connecting to online services and other corporate sites around the world via E-mail, networked modems and FAX modems. So you see, we don't just sell 600-MEG hard drives, high speed networked modems, and system 7 applications—they're all an integral part of our day to day operation.

"We stock more than 2,000 different products. If you don't see it here - Call us!"

ACCESSORIES

Advanced Gravis

7 1178 Mousestick 62.

Apple

1205 Toner/LaserWriter II 98.

CoStar

7 3454 Stingray Trackball 88.

DGR Technologies

4647 JetInc.Refill Twin Black . 17.

InCom

7 4026 CompuCase PowerBook 78.

Kensington

7 4345 NoteBook Keypad 98.

7 4692 Turbo Mouse V4.0 115.

Key Tronic

7 3129 Mac Pro Plus 138.

Maxell

7 1842 150-MB CS600XD 22.

Solidex, Inc.

4368 PowerBook Case Coskin . 88.

Sophisticated Circuits

7 4005 PowerKey w/QuickKey Lt 75.

Sophisticated Circuits, Inc.

4648 PowerPad 79.

BUSINESS

ACIUS

7 3588 4th Dimension V2.2 498.

After Hours Software

7 4582 DateBook 78.

7 3704 TouchBASE 79.

Aldus

7 4058 Persuasion 318.

Ark Interface, Inc

7 4007 Workspace 78.

Attain Corp.

7 3950 In Control 89.

Bananafish Software

7 4740 ThoughtPattern 1.3 94.

Caere

7 3589 OmniPage 458.

Calera

7 3658 WordScan Plus 378.

Ceres Software

7 3513 Inspiration 3.0.1 158.

Claris

7 3857 Claris Works 198.

7 2772 FileMaker Pro 208.

Computer Associates

7 4217 Cricket Graph 1.2.3 84.

DeltaPoint

7 3431 DeltaGraph Pro. 198.

Diamante Software

7 4279 Control Classic 298.

Fox Software

7 1588 FoxBASE+/Mac 309.

Intuit

7 3601 Quicken 3.0 40.

JIAN

7 4328 BizPlanBuilder 85.

7 4329 EmployeeManualMaker 94.

Microsoft

7 4356 Excel 4.0 295.

7 4357 Excel 4.0 Upgrade 95.

7 3485 Project 445.

7 4009 Word 5.0 294.

7 4347 WORD 5.0 Upgrade 124.

Now Software

7 4059 Up to Date (Single User) 64.

Pastel Development

7 3685 DayMaker 58.

PC Globe

7 4257 MacGlobe 45.

7 4258 MacUSA 34.

SoftSync

7 3086 Accountant Inc. 358.

Spider Island Software

TeleFinder

7 3945 Group Ed.-Unlimited 272.

Westware

7 4109 Contact Ease V1.3 188.

Wolfram Research Inc.

7 4678 Mathematica Enhanc. . 788.

WordPerfect Corp.

7 4111 WordPerfect V2.1 278.

GRAPHICS

Adobe

7 3942 Illustrator 3.2 w/ATM .. 368.

7 3487 Photoshop 2.01 548.

Aldus

7 4035 Freehand 3.1 388.

7 4024 Pagemaker 4.2 489.

7 4324 Personal Press 2.0 98.

7 3545 SuperPaint 3.0 128.

Altsys

7 4263 Fontographer 3.5 258.

Apple Computer

7 4608 QuickTime Starter Kit .. 158.

Broderbund

7 3796 TypeStyler 2.0 128.

Calliscope Software

7 4041 Satellite 3D 128.

Deneba

7 3394 Canvas V3.0 248.

Fractal Design

7 4085 Painter 1.2 248.

Light Source

7 4526 Qfoto 278.

Macromedia

7 4354 MacroMind Direc. 3.1 . 848.

7 2653 Swivel 3D Pro. 429.

PhotoDisc Inc.

7 4183 PhotoDisc Vol. I-CD 278.

Quark Incorporated

7 4006 XPress 3.1 558.

Specular International

7 3433 Infini-D 648.

Strata, Inc.

7 4082 StrataVision 3D V2.5 ... 628.

Virtus

7 3969 WalkThrough 258.

Vividus Corp

7 4205 Cinemation 378.

ENTERTAINMENT

Broderbund

7 3603 Kid Pix V1.2 35.

Casady & Greene

7 4346 Mission Thunderbolt ... 36.

Delta Tao Software

7 4057 Spaceward Ho! 2.0 35.

7 2891 Strategic Conquest 3.0 .. 35.

DigiTek Software

7 4250 Hole-In-One Golf 24.

Electronic Arts

7 3496 PGA Tour Golf 37.

Graphic Simulations

7 4070 HELLCATS 39.

ISM, Inc.

7 4326 Surgeon 3, The Brain 32.

Media In Motion

Interactive Training

7 4505 MacroMind Director 125.

Microsoft

7 3532 Flight Simulator 4.0 39.

Soft Wars

7 4528 Full Metal Mac 26.

Strategic Studies Group

7 3933 Warlords 38.

Triad Publishing, LTD

7 4578 Lottery Tracker & Wheeler 4.0 29.

Velocity

7 3596 Spectre 38.

Virgin Games

7 4001 Monopoly 31.

7 4428 RISK 31.

7 4000 Scrabble Deluxe 31.

7 4429 Spirit of Excalibur 31.

HARDWARE

Applied Engineering

7 4046 Plus Drive 308.

Asanté

Ethernet Hubs

7 3445 10T Hub/12 528.

7 4095 10T Hub/8 258.

Il, Ilx, Ilcx, Ilci, Ilfx

7 3705 MacCon3 NB 238.

Ilci & SE/30

7 3071 MacCon+ 30iET 198.

PowerBook SCSI Adapters

7 4093 EN/SC 368.

SCSI Adapters

7 4092 EN/SC-10T 258.

Caere

7 3837 Typist + Graphics 468.

Dayna Communications

LocalTalk to Ethernet Adapters

7 3038 EtherPrint-T 338.

DayStar Digital

7 4271 ComboCache Ilci-FPU .. 328.

7 4276 Equalizer LC w/FPU 258.

7 4982 FastCache Quadra (700 & 900 Only) 268.

PowerCache Accelerators

7 3740 40Mhz 798.

7 3743 40Mhz w/FPU 968.

7 3741 50Mhz 1148.

7 3744 50Mhz w/FPU 1398.

E-Machines

Color Displays

7 3721 T19 2498.

Everex

7 1551 EMAC 150-MB Tape 678.

Farallon

PhoneNET

7 1557 Connectors DIN-8 29.

Global Village

PowerPort

7 4815 Bronze 2400 218.

7 4813 Gold v.32bis 588.

7 4814 Silver 9600 438.

TelePort

7 3997 Full Fax Send/Receive . 228.

Lapis Technologies Inc

DisplayServer Video Cards

7 4745 ColorServer II-21 418.

7 4720 II Dual Page 168.

7 4716 II Full Page 178.

7 4721 LC Dual Page 168.

Monitors

7 4700 Dual Page - Mono 738.

7 4699 Full Page - Greyscale ... 578.

7 4698 Full Page Monochrome 458.

Micron

7 3654 XCEED Color 30 279.

Microtek

7 3824 ScanMaker 600ZS 1398.

NAC

7 2874 Hyper-Net Din 8 15.

Radius

Accelerators

7 4778 Rocket 25MHz 1612.

7 4779 Rocket 33MHz 2158.

Monitors

7 4783 Color Pivot 1368.

Video Cards

7 4803 Color Pivot II Interface . 518.

7 4794 PrecisionColor 24XP 518.

7 4791 PrecisionColor 8XJ 518.

RasterOps

Video & Multimedia

7 3181 24STV 828.

Seiko

7 3826 CM 1445 14" Trinitron . 598.

Shiva

7 2179 Ethergate 1289.

7 4452 LanRover/L 598.

SIMM

PowerBook Memory 140/170

7 3965 6-MB Psuedo-Static 298.

Single Inline Memory Modules

7 3179 1-MB 80ns 32.

7 3701 2-MB 70ns 65.

7 2738 SIMM 4-MB 80ns 120.

7 2770 SIMM FX 4-MB 80ns ... 138.

7 4754 16-MB High Profile 598.

7 4755 16-MB Low Profile 648.

Video RAM for LC, Quadra

7 4337 256K 37.

7 4338 512K 59.

Sigma Designs

15" Power Portrait Monochrome

7 4443 Platinum 828.

SuperMac

24 Bit Display Cards

7 4139 Spectrum/24 1078.

7 4156 Spectrum/8 • 24 PDO ... 898.

Monochrome/Greyscale Monitors

7 4169 Plat. 21" 2-Page 1138.

"We're Mac Compatible."

The Miracle Piano Teaching System

The Software Toolworks 7 The first keyboard that teaches you how to play it! Makes learning even the basics a pleasure. Professional keyboard with 49 standard-sized velocity-sensitive keys, 128 digitized instruments and sounds, with full MIDI compatibility. Includes hundreds of songs and lessons, and full orchestral accompaniment.

Call

DP + Hard Drives

Mac's Place 70 Available only at Mac's Place! These quality Quantum hard drives and Syquest Removable Cartridge drives come with DataWare formatting software, Alysis Software's More Disk Space and Nova's KaBoom! Special Edition. Each drive features a selectable SCSI ID.

See listings under Hard Drives

World Almanac and Book of Facts - Nautilus BackPac Volume III

Metatec 70 Easily search more than a million up-to-date facts in the World Almanac: e.g., Census, Major Acts of Congress, Persian Gulf War, World Series. BackPac III provides 2 gigabytes of indexed information/software: QuickTime, Windham Hill releases, educational software. AND SO MUCH MORE!

StuffIt Space Saver/StuffIt Deluxe 3.0

Aladdin Systems 0 StuffIt SpaceSaver provides complete on-the-fly compression. Increases disk space (with lightning speed) without effort on your part. **StuffIt Deluxe**, the most efficient compression product available. Solve all your compression needs, from archiving to transparent compression, and includes StuffIt SpaceSaver.

Pax Imperia

Changeling Software 7 Experience a universe of adventure and conquest. Rule an expanding empire while pursuing diplomatic relations with other emperors in neighboring star systems. Race for technological advancement and planetary discovery. Go where no Mac has gone before!

CAUSE 3.0

Pluma Software 7 CAUSE, the Personal Programmer. An object-oriented development tool with a built-in relational database. Cross-compatible with both Mac and DOS. No language or syntax required. Compiles to stand-alone. Writes documentation automatically. No royalties. Network version available.

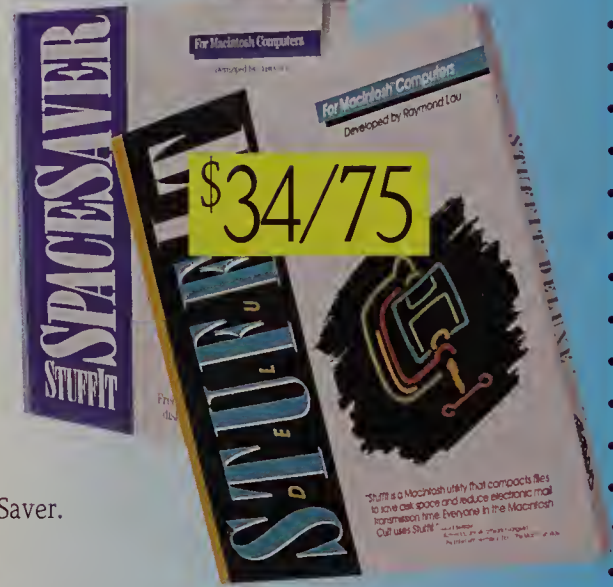
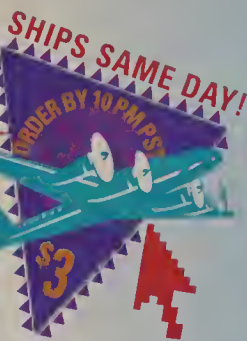
OPTIMA 24 & OPTIMA 96 Mac Bundles

Hayes 7 V.32/9600 bps transmissions plus: 38,400 bps throughput with OPTIMA 96 and 9600 bps with OPTIMA 24. You don't have to know anything about the modem you're calling. Automatic Feature Negotiation creates the most efficient combination of speed, error-control, and data compression every time.

ColorPage T16 II Trinitron

E-Machines 70 The best 16-inch display provides sharp, clear Trinitron performance with multiple resolution capabilities.

Plug-n-play with the built-in video of the Mac LC, IICI, IISI or Quadra. Or add a ColorLink SX/T interface card and get accelerated 24-bit color and Ethernet networking. All on one card that takes up just one slot.



\$51/44

\$34

\$188

\$148/388

\$1362

Call 1-800-367-4222 US & Canada • Visa/MC/AMEX accepted

make you smile."

Call 1-800-367-4222 or Fax your P.O. 1-206-881-3090

7 System 7 Compatible 0 30-60 Day Money Back Guarantee

Mac'sPlace



"We'll deliver it tomorrow for just \$3".

DateBook/TouchBASE Bundle

After Hours 7 **DateBook** combines calendar, scheduling, alarms, and to-do lists to keep track of all your daily activities. **TouchBASE** keeps all of your personal contacts at your fingertips. They work separately or together to help you manage your time and your contacts.

\$124

IntelliDraw

Aldus 700 **IntelliDraw** is an extraordinary new drawing program with intelligent features that give you an easy new way to visually experiment, refine, and draw your ideas. Visual "what-if", — innovative smart tools link graphics in your drawing so they respond to changes automatically.

\$198

Capitalist Pig

Pluma Software 7 New! Animated business simulation game challenges you to build and run your own business under authentic economic conditions. Experience terrorists, fires, scandals and more, as you battle for billions—or bankruptcy. Thought-provoking, educational and fun!

\$35

SupraFAXModem V.32Bis

Supra Corp 700 Fax and data communications have never been easier...or faster! This modem's 14,400bps transmission rate means unprecedented savings in time and phone charges. Fax direct from your Mac as effortlessly as you print, and get started right away: the complete package includes FAXstf and MicroPhone 1.6 software.

\$378

KaBoom! w/Mac's Place T-shirt

Nova Development Corporation 7 Add 150+ wild and wacky sounds to your Mac and never settle for a simple "beep" again! Roosters crowing, tires screeching -- even Ricky Ricardo telling Lucy she can't be in the show. Attach sounds to 24 different commands. Order now and get a limited special bundle – KaBoom! with Mac's Place T-shirt for \$34.

\$28/15

AsantéHub 1012/AsantéView SW

Asanté 700 The **AsantéHub 1012**, a 12-port intelligent 10BaseT hub, brings enterprise-level hub capabilities to departmental Ethernet networks. **AsantéView** network management software offers graphical in-band/out-of-band management, power, flexibility, and reliability at a very economical price.

\$998

CricketGraph III/Cricket Draw III

Computer Associates 700 New **Cricket Graph III**, a quick and easy to use charting application ideal for anyone who needs to create graphs for reports, presentations or data analysis. **Cricket Draw III**, an intuitive, object-oriented drawing program, produces professional-quality graphics. Both entry-level and skilled users will appreciate its ease of use and power.

\$128/168

ACT! for the Mac

Contact Software 700 New! This unique, integrated contact and calendar management solution handles your hectic schedule – automatically. Schedules calls, meetings, and to-do's. Generates a variety of written correspondence. Automatically and intuitively remembers every detail about each contact and activity – past, present and future.

\$244

Mac'sPlace

Call 1-800-367-4222 or Fax your P.O. 1-206-881-3090

7 System 7 Compatible • 30-60 Day Money Back Guarantee

"You can get great prices and great service."

Snooper

MAXA Corporation Find problems fast with Snooper, the revolutionary suite of hardware diagnostic and testing tools. Snooper is easy-to-use, powerful and saves you time. No set of Mac utilities is complete without Snooper, the hardware diagnostic. Also available with NuBus diagnostic card for only \$168.

\$128

Bernoulli Transportable 90MB Pro

Optical Access Intl. The Bernoulli Transportable 90 MB IOMEGA haslong been known for reliability. IOMEGA now offers fast, 19 millisecond access time, and affordable, removable storage with a 5-year warranty. Durable in design and built for speed.

\$698

Equalizer LC w/ FPU/Powermath LC/LC II

DayStar Digital Replace the LC's antiquated 68020 processor and get what Apple put in the new LC II . . . the powerful and reliable 68030 processor. Put a PowerMath chip card in your LC or LC II and boost your spreadsheet recalcs and math and science programs.

\$258/118

Soft/AT/Soft/PC 2.5

Insignia Solutions Add SoftNode to either Universal SoftPC or SoftAT and your Mac will run MS-DOS applications and share programs over a Novell PC Network! With SoftPC, your next IBM computer could be a Macintosh.

\$298/194

Classic Accelerator! w/FPU

NewLife Corporation NewLife Accelerators are designed for performance without sky-high costs. With an Accelerator! installed in your Mac Classic, even the most demanding software won't slow you down. Imagine...the performance of a IIcx in the footprint of your compact Mac! Call for complete pricing on all New Life Accelerators.

\$489

PROMotion

Motion Works Works Easily create full-color animations with multiple audio tracks, even if you can't draw. Interface follows traditional animation techniques ,such as cel-based actors, onion skinning and path-based motion. Other features include cel tweening and Pring to Video. Export your animations to QuickTime or Berkely Systems After Dark.

\$248

Painter 1.2/6x9 Tablet

Fractal/Wacom Personal Publishing's painting product of the year! Painter delivers real natural media effects, brushes, pens, chalks, and paper grains (22 included). The Wacom tablet has the premier pressure sensitive stylus.

\$698

Full Page Display

Lapis Technologies Allows the user to view a whole page, saving scrolling time, and increasing productivity. Compatible with Macintosh systems from the Plus to the Quadras, this 15" display provides 640 x 872 screen resolution at 80 dpi.

\$458

Call 1-800-367-4222 US & Canada • Visa/MC/AMEX accepted

Integrated Project-Planning Software

Fair Witness 1.1

PROS: Coherent combination of outlining, project info, scheduling, and voting; stores multiple versions of ideas; different views of same data can be stored and accessed via menu selection; links between views simplify navigation. **CONS:** Displays only one window at a time. **COMPANY:** Chena Software (215/770-1210). **REQUIRES:** Mac Plus; System 6.0.2. **LIST PRICE:** Version 1.2 \$295.



P LANNING A PROJECT USUALLY REQUIRES project-management software. While Fair Witness isn't a substitute for the typical project-management programs, it makes project planning easier by integrating the following actions in one program: outlining, information charts, time charts (scheduling), and voting.

When you start a project, you enter your ideas in Fair Witness's outline mode. As with other outliners, ideas can be in any order, since you can always reorganize them. Setting up subtopics and other outline hierarchy is important because Fair Witness depends on the outline's contents to create other views (or layouts) of the project. In outline mode, you can expand any subtopic

and display it independently. If you need to get back to another topic or another part of the outline, Fair Witness provides a pop-up menu that lists the outline's topics.

When you're ready to add more details to your project's outline, you can create an information chart and define the columns you want to add, such as start and finish dates, notes, and the person in charge of a project. These columns can contain text, numbers, dates (including time), icons, or pictures. If you create date columns (say for the start and finish dates of project stages), Fair Witness can display a Gantt chart. To alter dates in the chart you click on one end of the bar and drag it to a new date—new dates are displayed as you drag, and the information chart is updated accordingly.

While an outline can be a good way to organize a project, project priorities also have to be set. Fair Witness allows you to rank ideas in sequential order and have team members vote for ideas; you can then score the ideas on a predefined scale, or compare each idea against all other ideas. Each member of the team can cast a vote, and Fair Witness tabulates the results. (Fair Witness is not multiuser software; project leaders create a voting table or matrix and enter the votes.) Fair Witness can also create pie charts or bar charts to display the results.

Fair Witness lets you save formatted views and review them at any time. You can

assign a name to each view. These tagged views simplify moving between charts or outline views as you review your project. You can create any number of separate views—for project members, major project milestones, project resources, and so on. All the views are stored in the project's file.

Fair Witness lets you create links between items in different views in the same project. Thus, if you want to refer back to a particular chart from a major subtopic in another view of your outline, you can create a link and easily move between the two items. With Fair Witness you can also refine previous ideas without replacing them—the program uses a flip-page symbol with a number to show that a series of ideas is being stored (each idea in the series is time-stamped).

If you don't want to use the structured layouts, Fair Witness's free-form text mode allows you to place text anywhere on the screen, making it easy to group ideas or show links between groups of ideas.

Fair Witness can be a valuable tool for planning any project, but it's not a total solution for project management. I suggest using Fair Witness to plan your project and prioritize items within the project, then using more traditional project-management software (like MacProject II or Micro Planner Manager) to create PERT charts and allocate project resources.—DAVE KOSIUR

Ergonomic Keypad

The Bat

PROS: Best ergonomic input device I've seen. **CONS:** You have to learn to type all over again. **COMPANY:** Infogrip (504/766-8082). **REQUIRES:** Any Mac with ADB port; MultiFinder or System 7. **LIST PRICE:** Single keypad \$295; two keypads \$495.



I F YOUR KEYBOARD ISN'T CAUSING you pain, count your blessings. I joined the ranks of the computer-injured six years ago, thus qualifying to review The Bat, a new keyboard—or keypad, as the manufacturer calls it. It's the best ergonomic computer device I've seen, but let me hasten to add that this judgment is based on my own symptoms—pain and spasm in the right shoulder and neck. Though I now use a trackball with my left hand instead of a mouse with my right, the cramped arm and shoulder position enforced by the typical QWERTY keyboard still hurts. If you don't know what I mean by "cramped arm and shoulder position," put your hands on a keyboard and observe. If you're human, your arms are now hugging your sides and your shoulders are scrunching inward because

your hands are together on the keys and parallel to the ground. I try to counteract these constraints, thinking "chest up, shoulders back," as physical therapists instruct, but I can't fight the scrunch for long.

With the Bat I have no need to scrunch. Its right- and left-hand keypads slant the little fingers down and the thumbs up, opening the shoulders. Better yet, I can spread the keypads apart, or use only one of them—one unit can replace the entire keyboard. And since maintaining any position too long causes me pain, I'm delighted that The Bat allows me to change positions. (Though I'm focusing on ergonomics, I should add that The Bat is an excellent choice if you have use of only one hand, or if you need to type with one hand while using the other.)

I don't suffer from wrist or hand pain, so I can't say whether The Bat will help those who do. However, the built-in wrist rests keep wrist and hand aligned, preventing an injurious angle. Infogrip hopes that The Bat will cut down on repetitive-motion strain in the hands and wrists because only the thumbs move about on the keypads.

On the downside, to use The Bat you must learn to type all over again. Each keypad uses only 7 keys to replace the 60 or more on typical keyboards. You usually have to press several keys at once to type one character, "chording," much as you would on a piano. Your fingers rest on 5 gray keys,



The Infogrip Bat

except when you shift a thumb to a red or blue key to switch between letters, caps, numbers, symbols, screen movement, and cursor control. If you're in chronic pain and The Bat really helps you, its ergonomic relief is worth the retraining.

Bat advocates claim that chording increases input speed once you're used to it, but I can't say yet. After practicing during the evening news for a month, I can chord 25 words per minute, instead of my usual 80 on a standard keyboard. I still wish someone would manufacture a split, angled QWERTY keyboard like the one Tony Hodges designed (see *The Iconoclast*, *Macworld*, February 1990). In the meantime, I'll keep practicing on The Bat. If you want to try it, buy it direct from Infogrip, which offers a money-back guarantee, or from a vendor who offers one.—ANN GARRISON

Dye-Sublimation Printer

RasterOps CorrectPrint 300

PROS: Reasonably priced; 300 dpi; photo-realistic printing. **CONS:** Limited print area. **COMPANY:** RasterOps Corporation (800/729-2656). **LIST PRICE:** \$8999; 12MB of RAM \$1719; fully configured system with 36MB of RAM \$11,999.



UNTIL RECENTLY, 300-DOTS-PER-inch dye-sublimation printers cost in the neighborhood of \$20,000 to \$30,000. The RasterOps CorrectPrint 300 brings high-quality, photo-realistic printing to half that price. The CorrectPrint itself costs \$8999, but the printer needs a minimum of 12MB of RAM, plus a dedicated hard drive for font storage. RasterOps will sell you 12MB of RAM for \$1719 (you still need to buy a hard drive), or you can buy a fully configured printer system—with 36MB of RAM and no need for a hard drive—for approximately \$12,000 total.

Dye-sublimation printers can produce near-photographic images because they use a completely different imaging technique from that used by most Mac printers. Instead of printing cyan, magenta, yellow, and black dots next to one another and relying

on the viewer's eye to mix the colors, dye-sublimation printers lay translucent process-color dots one on top of another. Dye-sublimation printers can also vary the size of the printer dot itself. Most Mac laser printers build different-size halftone dots from a limited range of small printer dots; dye-sublimation printers can produce printer dots in a wide range of sizes. The CorrectPrint can lay down 256 sizes of printer dots. Because of this, it can build a wider range of halftone dots and thus can produce a wider range of colors. Theoretically, in fact, the CorrectPrint can represent every color a 32-bit file might contain. It can lay dots down at a rate of 300 per inch—fine enough to be visible only with a strong loupe. The disadvantage of these printers is that they require special media; four-color prints from the CorrectPrint cost \$3.94 apiece for letter size and \$4.09 for legal size, according to RasterOps.

The CorrectPrint has many features to recommend it besides price. It comes with a PostScript interpreter (a RIPS clone), so it can print files from programs like Aldus FreeHand. The CorrectPrint's ROMs include routines for JPEG decompression, which makes life easier if you use large bitmap files because you don't have to decompress them before sending them over a network to the printer. The device has built-in AppleTalk, Ethernet, SCSI, and RS-232C ports, plus a one-year warranty.

For our performance tests, we used the printer's maximum 36MB configuration. Our tests were run over an EtherTalk network taking advantage of the internal EtherTalk capabilities. If you use less than the \$12,000 version, you can expect a dramatic slowdown in performance; ditto for using AppleTalk. Still, \$12,000 is a good price for a printer with that much RAM and built-in EtherTalk, but don't expect miracles from the \$9000 bare-bones configuration.

The device was a little faster than average at printing bitmaps but was among the speediest printers at outputting PostScript files. RasterOps says new ROMs, which should be in printers by the time you read this, will improve bitmap printing by 50 to 60 percent—making the CorrectPrint quite a performer. (Users should contact the company for upgrade information.) As for color fidelity, the CorrectPrint's colors are accurate, though a bit oversaturated.

The CorrectPrint's most significant failure is its relatively small print area—8.1 by 8.6 inches on letter-size media and 8.1 by 11 inches on a legal-size sheet. RasterOps says the large margins are required to ensure perfect color registration, but other printer makers don't seem to agree. If you need a slightly bigger print, you might look into the Prime Option ColorRight, which sells for a price similar to the CorrectPrint's but prints up to 8.5 by 12.3 inches.—JOE MATAZZONI

Piano-Instruction Keyboard and Software

The Miracle Piano Teaching System

PROS: Brilliant conception; rich graphics; good value. **CONS:** Gives short shrift to dynamics and expression; oversimplified arrangements. **COMPANY:** Software Toolworks (415/883-3000). **REQUIRES:** Mac Plus; 2MB of RAM (3MB for color); hard drive; System 6.0.2 (6.0.5 for color). **LIST PRICE:** \$499.95.



WHEN THEY WATCH THE TV commercials for The Miracle Piano Teaching system, music teachers nationwide must shiver. Has it come to this, then? Do we have to sucker kids into learning music with Nintendo-style video games?

Not to worry. The Miracle may be a computer program, but it's no game. Instead, it's a painstakingly crafted, patient, and encouraging music and piano instructor designed to appeal to both kids and adults.

There are two parts to The Miracle kit: a four-octave stereo synthesizer that plugs into a Mac, and the software. The keyboard is no Steinway, but its full-size keys play louder when you strike them harder. (Even

nontracking keyboards in this price range don't have touch-sensitive keys.) It's also a real MIDI keyboard (it works with other Mac music programs; see *The Desktop Critic* in this issue). If you want to hear what it sounds like, I've posted some samples in the Macworld forum of America Online.

Once the keyboard is plugged into the Mac's modem port, and you've turned off Suitcase II and Adobe Type Manager, you're ready. The Mac plays a song for you. (No music is ever played without the sheet music on the screen, reinforcing the association of written to played notes.) You try just the right hand, as slowly as you want. The program encourages you, and suggests that you try it with the metronome. If you mess up, you try again, more slowly. Bit by bit, you're gradually prodded into picking up the tempo, adding the left hand, and piecing the song together. At lesson's end, The Miracle accompanies you with a synthesized orchestra. I may be a grizzled, cynical old reviewer, but that reward is an absolute thrill.

The 120 different songs you can learn aren't some wimpy assemblage of public-domain folk tunes; there are movie themes like *Star Wars*, rock from the Beatles, classical from the usual nineteenth-century greats, and so on. (It's not lost on me that pop songs are expensive to license; on behalf of the kids who will be that much more motivated to play, I thank Software Tool-

works.) Three arcade-style games pop up occasionally; all are done with great graphics and immense wit.

But, here's quibble #1: Since you always work with the metronome, you cultivate a firm sense of rhythm. Fine. But you also never learn phrasing, rubato, feeling, or pedaling. Quibble #2: For some inexplicable reason, the right hand always plays single-note melodies, and the left plays three-note chords. Not only are such pieces atypical of piano music in general, but left-hand triads often sound muddy. Quibble #3: In some of the arrangements the musical interest has been stripped away. (In the *Surprise Symphony*, the surprise chord itself is missing!) There are a few errors in the musical notation ("My Country, 'Tis of Thee" in 6/4 time?). Last quibble: The program is slow to change screens, especially in color, and there are a lot of screens.

Because dynamics and expression are almost completely ignored, relying on The Miracle as your sole instructional source could be dangerous. (The absolutely blockbuster piano method, of course, would be to use The Miracle under the supervision of a real teacher.) Even so, we can applaud The Miracle system for its breakthrough idea: to harness the popularity of the video age for the forces of education, self-improvement, and music. That may be no miracle, but it's a pretty good trick.—DAVID POGUE

Tile Game

Super Tetris 1.0

PROS: Better than Tetris; network and two-player options. **CONS:** Tiles are tiny; no DA. **COMPANY:** Spectrum HoloByte (510/522-1164). **REQUIRES:** Mac Plus; System 6.0.5; Mac II and 2MB of RAM for color. **LIST PRICE:** \$49.95.



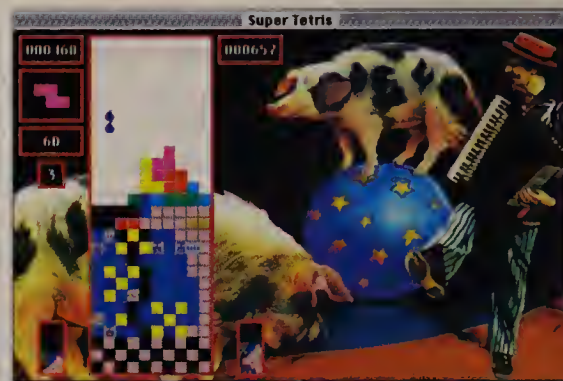
HERE'S ONE OF THOSE RARE INSTANCES where a new version of a game truly improves on the original. Super Tetris (ST) is more varied, more challenging, and more forgiving than regular Tetris, and I predict it will easily outdo its predecessor's widespread, cross-platform popularity.

The basic setup and controls are similar to those of Tetris. There is the pit, and there are the falling pieces. Each piece is composed of four squares, arranged in one of seven configurations. As the pieces fall one by one, you maneuver them (using the keyboard or an Advanced Gravis Mouse-Stick), trying to form horizontal lines. When you form a line, it disappears and you get points; when the pile of pieces reaches the top, the game is over. So far so familiar. But ST adds treasures and bombs, which provide strategic opportunities as well as a

few ways to prolong a cliff-hanging game. ST also offers two-player modes (competitive or cooperative on one Mac, or head-to-head on a network).

The pit in ST has a waterline halfway down; the underwater part has a black background and contains rubble—assorted squares—interspersed with spaces that you can sometimes fit pieces into. Nine kinds of treasure squares are scattered among the rubble; you get rewards when you blow them up with bombs. As you complete lines, the pit scrolls upward, and you can see on a little map not only how far you are, but also a hidden picture revealed in the rubble you have eliminated.

My favorite new feature is the bombs. When you make a line, 2 bombs fall; if you make 2, 3, or 4 lines at a time, you get 4, 8, or 12 bombs, respectively. Bombs—which detonate on impact—can blow up one square each; you can use them to pare off the top of a too-tall tower or remove obstructions. With practice you can scoot the bombs about as they fall, taking out a square here, a square there, and carving a space for your next piece to fit into. When you blow up treasures, you get extra space, extra bombs, or extra pieces (unlike Tetris, ST starts you out with a finite number of pieces). You'd think all this extra stuff would be distracting, but everything works together just fine.



Networking in the Nineties Select your opponent from a list of current ST players on the network, and go for it. You don't see your opponent's game in action, but you see his or her score (to the upper right of the pit). The two small rectangles to the lower left and right of the pit show your rubble-clearing progress vis-à-vis your opponent's; note the hidden pictures (smiling pink pigs) taking shape.

It's hard to find things to criticize in ST. The tiles have shrunk; presbyopes (like me) may need reading glasses to play in black-and-white. Much of the screen is taken up with gorgeous Moscow Circus scenes; I'd happily give up a bear or two for slightly bigger tiles. And if you try to play in two-player mode on an SE or a Plus, the game slows way down. Oh, and there's no DA version, as there was with the original Tetris.

But what a great game! I'm giving it four stars (instead of five) only because of the teensy tiles.—FELICITY O'MEARA

Education Game

Where in the World Is Carmen Sandiego?

PROS: Fun educational tool; amusing animated sequences; great sound effects; straightforward interface. **CONS:** Heavy memory requirements; repetitive pictures and animation; already an occasional out-of-date geographical fact. **COMPANY:** Brøderbund Software (415/382-4400). **REQUIRES:** Mac II (also runs on LC); 4MB of RAM; 9MB of hard drive space; 8-bit color monitor; System 6.0.7. **LIST PRICE:** \$79.95.



WHERE IN THE WORLD IS CARMEN Sandiego? is already a successful educational game, even branching off into a TV show. A game so good is impressive enough, but Brøderbund has succeeded in making a good thing even better with the new Deluxe Edition.

The plot is probably familiar to many—a member of the V.I.L.E. gang, headed by the notorious Carmen herself, has stolen a famous object—say, the first Walkman from Japan or Tolstoy's writing desk from Moscow—and the player must retrieve the object and catch the thief. An almanac, in-

cluded with the game, is an essential tool for understanding the geographical clues and for learning research skills.

The interface is beautifully straightforward, with a single screen consisting of the player's Videophone, notepad, Dataminder, and a scene window. Everything needed appears within that screen, making the game remarkably easy to use and understand. (A couple of players' experiences indicate that it is a good idea to read the directions despite this seeming simplicity.)

You use the Videophone to call your boss at the Acme Detective Agency, Warren (the robot who issues arrest warrants), and occasionally informants, all of whom actually talk to you while a text copy of their words appears in the Dataminder. The Videophone is also used to contact the travel department and the crime net, as well as receive news flashes when a case is completed.

The notepad is a list of tasks for each new location. Click on a task, and you talk to a witness, search a site, or consult the crime net or an informant. A red check mark appears next to the task as clues are revealed.

The Dataminder has buttons that allow you to enter evidence into your database, check the dossiers on the V.I.L.E. gang members, access facts on the various countries, send information to the warrant robot, and start a new case. A button with a flashing red light indicates that more information

is available. Unfortunately, the red light is not all that noticeable, sometimes causing confusion. Clues from the crime net and information on the countries are shown as text in the central box of the Dataminder.

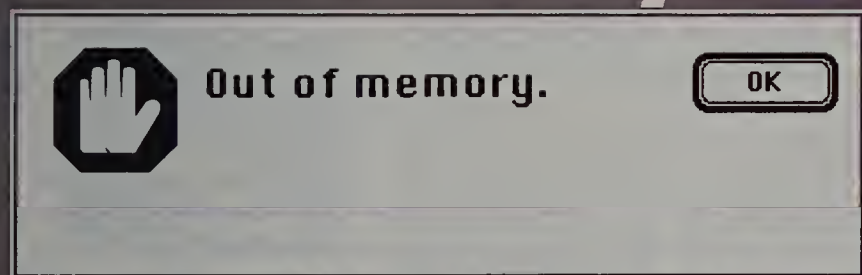
The window shows various scenes, including pictures of the locations (lovely, but static and eventually repetitive) and brief animated sequences with clever, sometimes slapstick humor. The sound effects, from the rumble of the planes to the whistles, shouts, and crashes of the arrests in process, are truly wonderful.

Where in the World Is Carmen Sandiego? Deluxe Edition suffers a bit from the problems that plague geography texts in the 1990s. In the game, Moscow is still the capital of the Soviet Union, and while Burma has become Myanmar, and its capital is Yangon, the first information I read about Myanmar told of a city called Rangoon. Still, without almost daily updating, no geography source can be perfect these days.

This deluxe version has 45 countries to visit, with 20 villains to capture, and 5 levels of difficulty—all a substantial increase over the original. More than 2500 clues ensure plenty of opportunity to learn lots of facts about the world.

This is education that's fun for kids and adults. I learned a tremendous amount by playing it, and enjoyed myself as well. Yes, Brøderbund's done it again.—WENDY SHARP

Coming soon to a screen near you.



If you think the only way to avoid running out of memory is to avoid running a couple of your favorite applications, think again.

Think about all those memory-hogging fonts and sounds you've got stuffed into that bulging System File.

Then do what over 200,000 resourceful Mac users do every day.

Instead of closing your applications, open a Suitcase.™

Suitcase is the award-winning utility that lets you park your growing collection of fonts, DAs, FKEYs and sounds *outside* the System File.

Thereby giving you the maximum amount of memory for running more applications, building bigger documents and doing other useful things.

What's more, Suitcase compresses your screen font and sound files by up to 60%.

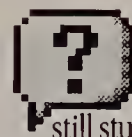
Thereby giving you that much more precious disk space to work with.

It even lets you put your screen and printer fonts on a server for all to share.

Thereby making each disk on the network that much more spacious.

The more resources you have — and the more organized you are — the more memory and disk space you'll save.

But whether your dividends are measured in megs or merely in Ks, Suitcase is guaranteed to save you gigabytes of aggravation.



Even if you're operating in System 7.

Because System 7 still stuffs your resources into your System File.

And System 7 still makes you close down all your applications and restart your Mac each time you install a new font.

Which is a real pain in the, uh, system.

Suitcase, on the other hand, gives you unlimited access to all your resources.

And total control over how you organize them.

Each suitcase can pack up to 800 fonts, 64 DAs, and any number of FKEYs and sounds.

You can group suitcases into sets, then summon all the luggage that

Can't remember the difference between Versailles and Monaco? Not to worry. Suitcase displays your typefaces right in the menu.

belongs with a particular project at the click of a mouse.

Tips are optional. But here's one for those of you who find font ID conflicts even more irritating than running out of memory.

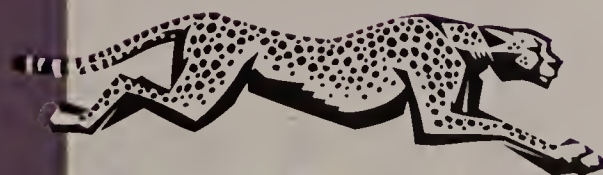
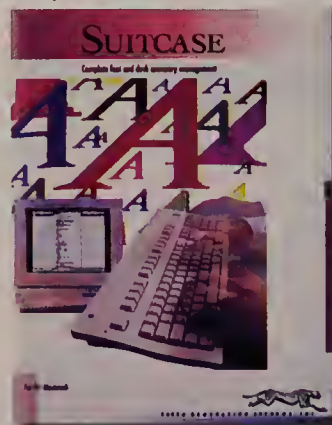
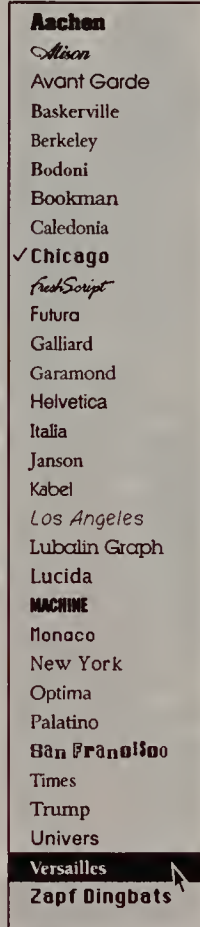
Get Suitcase. It eliminates them.

Call us at 1-800-477-8212.

We'll tell you about our vaunted 24-hour toll-free technical support.

We'll also tell you that Suitcase is backed by a one-year money-back guarantee.

So you can be sure this baggage will live up to its claims.



FIFTH GENERATION SYSTEMS, INC

Circle 135 on reader service card

Printer Chooser

easyPrint 1.0

PROS: Switches output devices quickly and easily; inexpensive. **CONS:** Documentation on disk.

COMPANY: SF/O (415/328-9906). **REQUIRES:** Mac Plus; printer; System 6.0.5. **LIST PRICE:** \$29.95; 10 copies \$99.95; 50 copies \$399.95.



BACK IN 1989, APPLE COMPUTER promised that System 7 would contain a new print architecture allowing users to, among other things, print by dragging documents onto icons of printers on the desktop. Last May at the Apple Worldwide Developers Conference, that promise was renewed, but the release date was pushed back to "sometime in '93." If you're as sick of the Chooser as I am, wait no more. Instead, pick up a copy of easyPrint, a nifty utility that lets you switch output devices without using the Chooser desk accessory.

The easyPrint utility itself doesn't switch printers; you use it to create small applications (about 50K each) that do the actual job. When you launch easyPrint, a dialog box appears with a pop-up menu listing each device for which a Chooser driver exists in the System Folder, including laser

printers, imagesetters, plotters, label printers, fax modems, slide makers, and more.

Choose the output device from the printer-type pop-up menu. If it's a networked printer, you must specify the name and zone. Under System 7, easyPrint lets you pick from a dialog box that shows the available zones and devices. But under System 6, you must obtain this information using the Chooser, write it down, and then type it into easyPrint.

After selecting an output device, you're prompted to enter a name and location on disk for the application that easyPrint will create. Since you needn't use the same name as that which appears in the Chooser, call the printer whatever you want, whether it's by location, printer type, or nickname. The applications also bear the same icons as the printers they represent.

To switch printers, launch an easyPrint application either by double-clicking on its icon on the desktop or by using a launching utility such as Icon Simulations' On Cue. Under System 7, you can place easyPrint applications in the Apple menu for quick access, or drag documents onto a printer icon to select that device and print the document, too. You can configure the Mac to launch an easyPrint application on start-up so that a particular printer is always the default output device. In addition, there's much less chance of compatibility problems

than if easyPrint were a system extension.

On my Mac IIci it takes three seconds to switch printers using an easyPrint application, during which time an alert box appears informing you of the change. That's faster than it usually takes just to open the Chooser, not to mention make a selection and then dismiss that annoying "You have changed your current printer" dialog box.

SF/O's package is recycled cardboard, and it forgoes the traditional printed manual. Instead, the documentation comes on disk with a HyperCard-like browser. Unfortunately, the directions are riddled with typos and deviations from the *Apple Publications Style Guide & Glossary*. SF/O pats itself on the back claiming "our 'electronicDoc doesn't use 32,000 pieces of 8.5 x 11 paper." That's true, but printing the documentation requires 100 full pages, with 75 percent of each sheet wasted on white space.

At only \$29.95, easyPrint is a bargain for users who frequently switch between several output devices. But the real beneficiaries are network users. easyPrint greatly simplifies this task, but it doesn't replace the Chooser altogether; you need the Chooser to mount file servers and to toggle background printing. Still, the program is so simple, it's doubtful you'll ever need SF/O's technical support, which is available via a toll call, America Online, AppleLink, the Internet, and U.S. mail.—OWEN W. LINZMAYER

Numerical Mathematics Software

HiQ 1.0

PROS: Amazingly fast at pure crunching; follows the Mac interface; thorough manual; champion at matrix and boundary value problems. **CONS:**

A bit formidable for beginners. **COMPANY:** Bimillennium Corporation (408/866-2010).

REQUIRES: Mac SE/30; math coprocessor; hard drive; System 6.0.5. **LIST PRICE:** \$695.

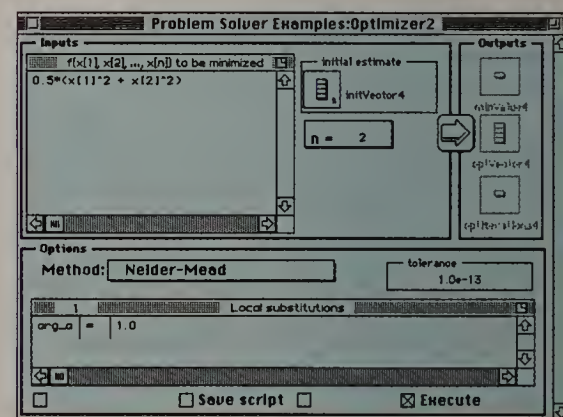


HIQ IS ADVERTISED AS "POWER Computing Software"; and for the tasks it addresses, it is, in fact, the most powerful numerical software for the Mac. This is not a symbolic computation program, as are Theorist, Maple, and Mathematica. It's strictly numerical, strongly engineering-oriented, and it's designed to push the limits of desktop numerical computing. HiQ can do, quickly, matrix problems that make MATLAB (longtime industry-standard matrix software) hang up and report system errors; HiQ can solve, using simple settings in dialog boxes, boundary-value problems for ordinary differential equations that need a lot of code-writing in Mathematica.

Bimillennium gets high marks for designing one of the few math software pack-

ages that isn't obviously derived from a Unix-machine command-line-based ancestor. There's a tool palette for defining objects (data, methods, graphs) on project worksheets, and the worksheets themselves are modeled on standard engineering notebooks. To solve a problem, you first define your symbols (HiQ-speak for scalars, vectors, matrices, graphs, and solvers) and then open one of the solvers to start computation. A typical solver dialog box gives you an editing window for defining variables and equations and a list with a choice of numerical methods, where appropriate.

These numerical methods in the solvers are the heart of HiQ. I am at a loss to explain why HiQ doesn't blow up on problems involving ill-conditioned 100-by-100 matrices. The references for each function detail the sources of the algorithms used, and these algorithms are in many cases the same ones used by other software. Yet no other math software for the Mac can get through such computations. The solvers—for expressions, polynomial and general roots, nonlinear equations, integration, statistics, optimization, and initial-value and boundary-value problems in differential equations—report not only timing and numerical accuracy or results, but generate code for the statement and solution of the problem in a HiQ script window. HiQ script is a simple language with program control commands like those



Math at Work HiQ's clean and efficient interface leads you right to the heart of the program, a highly optimized set of solver routines for a large array of applied mathematics problems.

in C or Pascal but displays an endearing nonchalance about data structures and variable typing, and you can easily customize computations since all the mouse-clicks generate script.

This software is not the first choice for freshman calculus classes, but it's the right choice for serious engineering work, or as a replacement for other packages when severe numerical challenges cause the Mac to crash, take forever, or generate nonsense. HiQ can overpower mainframe-grade calculations and has dazzling graphics, an intelligent interface, and a useful script language you can learn in an afternoon.

—CHARLES SEITER

QuickKor Lease YOUR MAC!

LEASING
MAKES
GOOD
SENSE!

CONSIDER THESE ADVANTAGES

- Leasing is FAST and EASY!
- Get more computer for your money - Leasing costs less
- Tax advantage - payments can be a deductible expense
- Have the system you need NOW, when you need it!
- Conserve your working capital
- Equipment pays for itself
- Have flexibility to expand

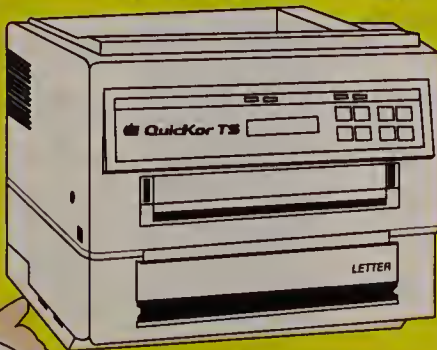
HERE'S HOW:

Just call with your business info, trade references and bank contact. We'll quote your package and ship your order upon quick credit approval!

*All leases are 3 year leases w/10% residual. Call for details.

BUSINESS
LEASES
AT AMERICA'S
BEST RATES!

QuickKor TS POSTSCRIPT LEVEL 2 PERSONAL LASER



Add the QuickKor TS Laser Printer to any package for just **\$69 per month**

- 35 genuine Adobe P/S fonts
- Auto switch between 4 optional paper trays
- Super fast RISC controller
- 2 MB RAM upgradeable to 10
- SCSI port for adding a hard drive
- Compact design
- Includes QuickKor Kare

Call MacFriends Today... The QuickKor The Better!!

Call Toll Free Today!

800 331-1322

24 HOUR QUICKFAX: (503) 286-8710 LOCAL: (503) 286-9350

68040 at 25MHz

"Power User" Mac Quadra 700 **\$299*** per month

5 YEAR HD WARRANTY

- 20MB RAM
- 422MB Hewlett Packard HD
- E-Machines T-16II Multi-Res. Color Monitor
- Extended Keyboard w/Quickkeys Light
- QuickKor Kare

hp HEWLETT PACKARD INSIDE

68030 at 25MHz

"Business Plus" Mac IIfx **\$213*** per month

5 YEAR HD WARRANTY

- 8 MB RAM
- 234 MB Hewlett Packard HD
- 16" Trinitron Color Monitor
- E-Machines Double Color Card
- Ext Kybd w/Quickkeys Light
- QuickKor Kare

hp HEWLETT PACKARD INSIDE

68030 at 16.66MHz

"Office Manager" Mac LC II **\$95*** per month

- 10MB RAM
- 40 MB Hard Drive
- 14" Color Monitor
- Ext Kybd w/Quickkeys Light
- QuickKor Kare

68030 at 16MHz

"Fast Track" PowerBook 170 **\$174*** per month

- 8 MB RAM
- 40 MB HD
- Apple Send Fax Modem
- 1.44 Super Floppy
- Reads DOS Disks
- Lightweight
- Carrying Case
- QuickKor Kare

68040 at 33MHz

"Creative Director" Mac Quadra 950 **\$439*** per month

5 YEAR HD WARRANTY

- 16 MB RAM
- 422 MB HP HD
- 19" Trinitron Monitor
- E-Machines Futura MX 24 Bit Video Card
- Ext Kybd w/Quickkeys Light
- QuickKor Kare

hp HEWLETT PACKARD INSIDE

A QuickKor Lease on a QuickKor Printer makes fast work of any job!

"The Executive" Mac si **\$122*** per month

68030 at 20MHz

- 9 MB RAM
- 120 MB Maxtor Hard Drive
- 14" Color Monitor with 256 Colors
- Ext. Kybd w/Quickkeys Light
- QuickKor Kare

Why Lease your Mac from MacFriends?

- Competitive Pricing
- Customer Package Design Assistance
- Better Performance and Warranties
- Unlimited Toll-Free Technical Support for 2 years
- Products Pre-assembled and Tested
- We're the Nation's MAC Specialists!

STOP!

Don't be fooled when comparing systems.

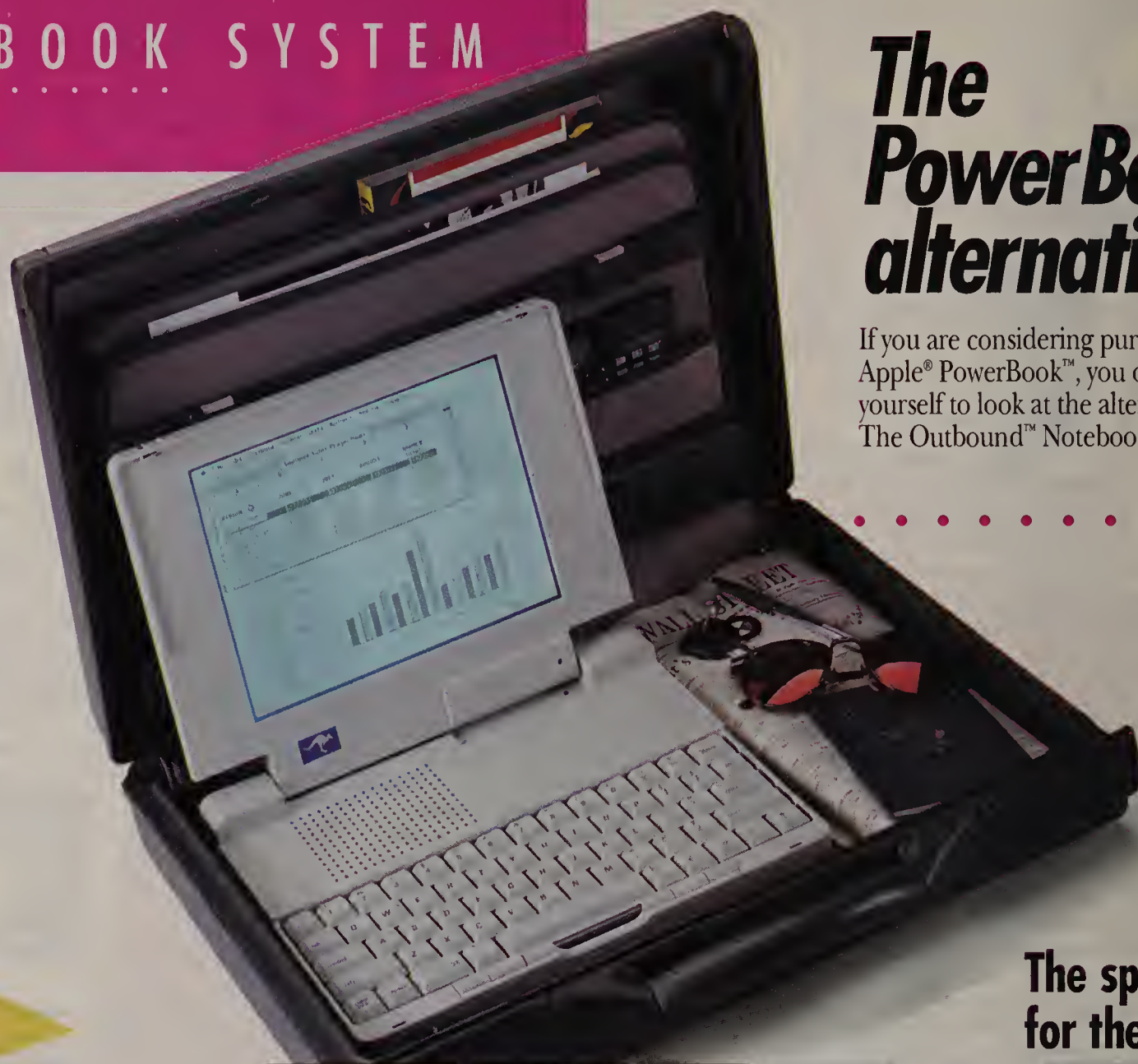
QuickKor Kare

- 2 years extended service
- Next day air equipment replacement
- Unlimited toll free technical support (Unlimited hand holding by experts!)



NOTEBOOK SYSTEM

THE OUTBOUND



The PowerBook alternative...

If you are considering purchasing an Apple® PowerBook™, you owe it to yourself to look at the alternative — The Outbound™ Notebook System.

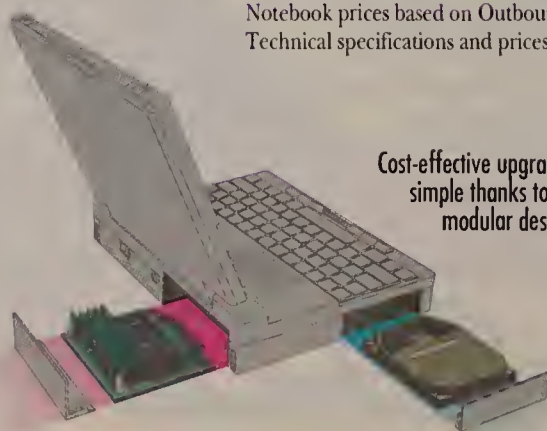
Low
Direct
Prices

Smaller, lighter, faster, upgradeable

The Outbound family of Notebook computers are up to 50% faster than PowerBooks, 7% lighter, provide 17% more screen area and are a true notebook size at 8.5" x 11". Their unique modular design lets you "mix and match" the CPU, hard drive, and memory you want, before and after you buy. You get the performance you need at the start, then upgrade simply and easily by installing low-cost modules.

- Hard drives from 20 MB to 120 MB
- CPUs from 20 to 33 MHz
- RAM from 2 to 14 MB

Notebooks use genuine Apple ROM and System Software and are equipped with all of the ports you'd expect in a Mac®.



Cost-effective upgrades are quick and simple thanks to Outbound's unique modular design.

The specs speak for themselves:

MODEL	OUTBOUND NOTEBOOK 2000	APPLE POWERBOOK 100	OUTBOUND NOTEBOOK 2030	APPLE POWERBOOK 140	OUTBOUND NOTEBOOK 2030E	APPLE POWERBOOK 170
Upgradeable CPU	YES	No	YES	No	YES	No
Internal Floppy Standard	YES	No	YES	Yes	YES	Yes
Processor Speed	68000 20 MHz	68000 16 MHz	68030 20 MHz	68030 16 MHz	68030 25 MHz	68030 25 MHz
Maximum Hard Drive Available	120 MB	40 MB	120 MB	80 MB	120 MB	80 MB
Full size silent keyboard and true notebook size	YES	No	YES	No	YES	No
Maximum RAM Available	4 MB	8 MB	4 MB	8 MB	14 MB	8 MB
Math Coprocessor	No	No	Optional	No	Optional	Yes
Price	\$1899 2000/220 2 MB RAM 20 MB HD	\$1599 100/220 2 MB RAM 20 MB HD Ext. floppy	\$2449 2030/440 4 MB RAM 40 MB HD	\$2999 140/440 4 MB RAM 40 MB HD	\$2771 2030E/440 4 MB RAM 40 MB HD	\$4299 170/440 4 MB RAM 40 MB HD

Notebook prices based on Outbound direct sales. PowerBook prices reflect published Apple retail pricing. Technical specifications and prices subject to change without notice.

Enjoy Mac compatibility

The Macintosh ROM is pre-installed with memory conscious System 6.0.7, but Outbounds are fully compatible with System 7 and thousands of Macintosh applications. All models include an internal SuperDrive™ equivalent floppy disk drive for working with high and low density Mac and MS-DOS® diskettes.

The experts love it too!

"Outbound offers top-notch portable Mac."

MacWEEK Magazine

"Outbound's notebooks are solid machines and deserve serious consideration by anyone contemplating buying a Mac notebook."

Macworld Magazine

"Innovative touches, a high degree of compatibility, and moderate pricing make the Outbound Notebooks strong competitors with Apple's portable Macs."

Portable Office Magazine

"For me, the Outbound Notebook is the better choice."

1991 BYTE Award of Merit

BYTE Magazine

"Outbound's new Notebook System has the unique ability to grow along with your requirements — and your budget."

MacUser Magazine

5555 1/2

OUTBOUND NOTEBOOK 2030S	NO COMPARABLE POWERBOOK
YES	Not Available
YES	Not Available
68030 33 MHz	Not Available
120 MB	Not Available
YES	Not Available
14 MB	Not Available
Optional	Not Available
\$3509 2030S/440 4 MB RAM 40 MB HD	Not Available

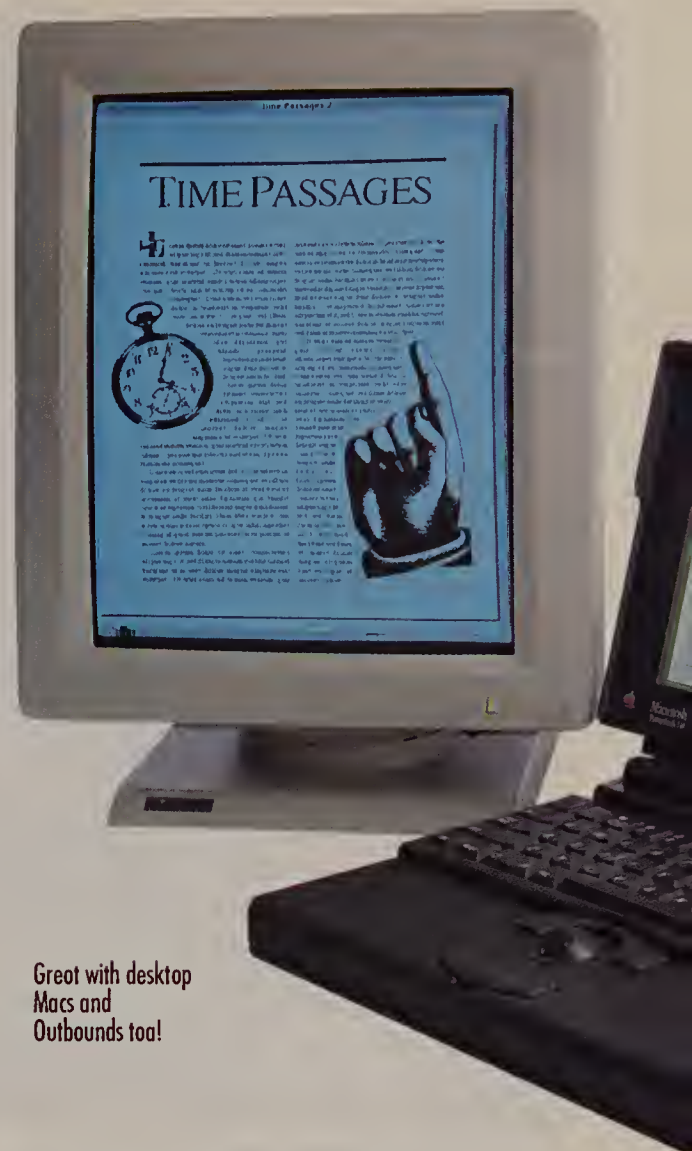
The Outbound name, logo, TrackBar, Outrigger and Pocket Port are trademarks of Outbound Systems, Inc. Apple, Macintosh and Mac are registered trademarks of Apple Computer Inc. PowerBook and Apple SuperDrive are trademarks of Apple Computer Inc. All other brand and product names mentioned herein are trademarks or registered trademarks of their respective holders.

and mobile Mac accessories

Like our Notebook, you can count on Outbound peripherals and accessories for innovation and 100% compatibility with Macintosh and Outbound computers.

The Outbound Outrigger monitor ►

Our Outrigger™ Intelligent portrait monitor for instance, eliminates the expensive SCSI interface normally required to hook a computer to a full-size monitor. A simple SCSI cable will connect the Outrigger to your Outbound Notebook, Apple PowerBook or any Macintosh. It sports a lightning fast, built-in 20 MHz 68000 processor and an extra SCSI port for even more versatility. The Outrigger increases your screen area up to 200% and helps turn your notebook into a true desktop station.



Great with desktop
Macs and
Outbounds too!

The Pocket Port Fax modem

When you're on the road, smaller and lighter is better, as long as it's powerful. And that's the story with our Pocket Port™ Fax modem. This featherweight offers data compression and error correction at speeds up to 9600 bps. At just 3.3" x 2.3" x 1" and 3.5 oz., it's fully ADB powered, ending the need for heavy AC adapters or batteries.



Ultra
lightweight and
compact.

10 day money back guarantee

All Outbound Systems and our growing array of portable computing accessories and peripherals carry a full 10 day money back guarantee, when purchased direct — so you can see the advantages for yourself, RISK FREE! All Outbound products come with a one year warranty and toll-free customer support.

Order direct and save

You can order Outbound products right from the folks who make them. Just call toll-free and use your credit card. And when you call, be sure to ask about our low-cost financing and our expanding family of products for your mobile Mac office.

► For a complete listing of Outbound's peripherals and accessories ask for your free Outbound product guide today.

1-800-444-4607

Or call for the Outbound dealer nearest you. 7 a.m. to 6 p.m. Mon.-Fri. and 8 a.m. to 4 p.m., Saturdays Mountain time. Visa, MasterCard, Discover and American Express accepted. Overnight shipping available.



Outbound Systems, Inc. 4840 Pearl East Cir.
Boulder, Colorado 80301
Phone: 303.786.9200 Fax 303.786.8611

Circle 23 on reader service card

Construction and Remodeling Software

ConstructionMac 1.2

PROS: Flexible; comprehensive toll-free phone support; extensive list of materials. **CONS:** Complicated; slow; high memory needs; disorganized, incomplete documentation. **COMPANY:** Revelar Corporation (801/485-3291). **REQUIRES:** Mac Plus; 2MB of RAM (4MB with System 7); hard drive; System 6.0.5. Recommended: Color monitor. **LIST PRICE:** \$99.



MAKING FIVE TRIPS A DAY FOR supplies is remodeling or new construction at its worst. ConstructionMac aims to organize your project so you know in advance what you will need, about how much it will cost, and realistically when the project will be finished. The program achieves those goals to a limited extent—and with much work from you.

A project summary window contains a table of estimated and actual cost subtotals for 15 phases of a project. Of these, 11 phases have separate estimator windows for calculating and listing detailed costs. You can type detail items or copy and paste many items at a time from a comprehensive materials window. ConstructionMac intelli-

gently narrows its list of 1200 materials to items relevant in one estimator window at a time, helping ameliorate the program's overall slow scrolling.

Nine of the estimator windows calculate costs for some detail items but not others. In the drywall estimator window, for example, ConstructionMac calculates the cost of drywall and its installation, and calculates the quantity of joint compound and joint tape. You can transcribe the calculated costs into the drywall-cost table, but you must multiply (with a pocket calculator or maybe your brain) the calculated quantities by their unit costs before you can enter the total costs of those items.

You may have to break a project phase into multiple sections. For example, you might separately calculate the cost of ordinary drywall, waterproof drywall, and fire-resistant drywall. Subdividing like this gets complicated, and the documentation doesn't give enough guidance. Also, you must somehow divine numerous detail items, perhaps by scanning the materials window. In the rough carpentry estimator window, for example, you should include nails of various types, framing connectors, joist hangers, and other hardware. You have to speculate on quantities for the miscellaneous items you need and calculate their costs.

ConstructionMac doesn't recalculate whenever you change an input. Instead,

clicking a button in an estimator window updates calculations in that window and posts the total costs of the window's detail items to the project summary window. Buttons at the bottom of each estimator window conveniently lead to the other estimator windows.

Other windows compute square footage, wallpaper quantities, board feet of lumber, and quantities of plywood or other sheathing. Using one of these four windows sometimes scrambles the display of the estimator window beneath it, but closing and reopening the estimator window restores it.

ConstructionMac includes a simple project-scheduling application. It lacks graphic input or output, so you enter a start date, task durations, and optional task costs in a table. Nonstandard keyboard navigation complicates this entry; you press arrow keys (not tab) to move among table cells. To see which cell you've selected you must press the enter key. You can also tediously select cells with the mouse. Clicking a button calculates the start date, end date, and several other statistics for each task.

Revelar is extensively revising ConstructionMac to fix many of version 1.2's shortcomings. For now I can't recommend the program to people who have never done remodeling or construction work, but those with some experience may find it helps organize their next projects.—LON POOLE

Fax Modem with Voice Mail

Ultima Home Office

PROS: Easy-to-use fax and voice software. **CONS:** Voice software is buggy; poor response from technical support. **COMPANY:** Prometheus Products (503/692-9600). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 6.0.4 (System 6.0.7 or System 7 for voice features). **LIST PRICE:** \$649.



THE ULTIMA HOME OFFICE IS A 14,400-bits-per-second data modem, a send/receive fax modem, and a voice-mail system. The fax-modem component operates well, but the data modem and the voice-mail system need work to be acceptable.

In my tests, faxing worked well. I was able to send and receive faxes from a variety of stand-alone fax machines, and between two other fax modems. To send a fax, you select the fax driver in the Chooser and choose Print from within whatever application you're using. Alternatively, you can use Maxfax to install a Fax menu in any application's menu bar.

Data transfer was disappointing. The modem worked fine at 2400 bps connecting to America Online and other services, but it disconnected randomly and unexpectedly at

9600 bps and 14,400 bps when used with a variety of telecommunications software.

The voice-mail system makes this product different from the other V.32bis modems on the market. You use the Maxfax software to set up, on the computer connected to the modem, a separate voice mailbox for each user; users can then call in, play back messages, and delete them remotely. To receive voice messages, the Maxfax application must be open; when a call comes in, Maxfax switches to the foreground and the voice-mail feature takes over the Mac until the call ends.

When you want to retrieve messages, the software has a nifty Tollsaver feature, so that if you call in long distance and have no messages waiting, the modem doesn't pick up for a user-defined number of rings. When you have messages waiting, the modem answers on the first ring (also user configurable). So, if you hear more than one ring, you know there are no messages and you can simply hang up.

You record your greetings for the voice mailbox using the Mac's built-in sound input; with an external sound digitizer such as Macromedia's MacRecorder; or with a telephone plugged into the modem. Voice quality recorded through the modem was only fair; one friend who left a message complained that the outgoing messages sounded as though they had been recorded underwa-

ter. Incoming messages were intelligible, but not as clear as those I get on my 7-year-old analog answering machine. Some improvement in voice quality would be welcome.

Callers were able to leave messages easily, and my wife and I could call in and retrieve our messages from our individual mailboxes without difficulty. Unfortunately, I found some bugs in the voice-mail software. For example, when I had my telephone plugged into the modem and I picked up the receiver to make a call, the voice-mail software interpreted it as an incoming ring and brought the Maxfax software to the foreground. The most annoying bug was that when I deleted message files, the names of those files still appeared in the Maxfax message queue; repeated attempts to delete the names resulted in a message that the deleted files could not be found.

The response from Prometheus technical support was underwhelming. Only half of my calls were answered. Some calls were returned the next day, and my questions were answered promptly and completely.

The Ultima Home Office shows real promise. The Maxfax software, in particular, makes it easy to manage fax and voice messages, but until Prometheus improves its support response, and until the modem can reliably transmit data at high speeds, and the voice software's bugs are fixed, I suggest you steer clear of this package.—TOM NEGRINO



THE BEST 16-INCH DISPLAY. PERIOD.

When it comes to your display, the best is not a luxury, it's a necessity. So why settle for less when your performance is on the line? Smaller or fuzzy screens are unproductive and fatiguing. That's why the



Best 16-Inch Display	
Sony Trinitron Tube	YES
Four Resolutions 13" 16" 19" 21"	YES
Works with Built-In Video of Mac IIci, IIsi or Quadra	YES
MPR II	YES

perfect for text and graphics. For more room the 19-inch and 21-inch Two Page modes are ideal for two page layouts or large spreadsheets. The T16 II meets the world's toughest Swedish MPR II standards for unexcelled safety. And it's compatible with the

award winning ColorPage T16 II uses the 16-inch Sony Trinitron tube, the choice for professionals. The crystal-clear ColorPage T16 II is the only display to give you the flexibility and productivity of four display resolutions. Choose the enlarged 13-inch Presentation mode or an actual size 16-inch Full Page mode that's

Mac IIsi, IIci or Quadra built-in video. When your performance is on the line, why settle for less than the best — ColorPage T16 II



E-MACHINES

For your nearest dealer or international distributor:
9305 SW Gemini Drive,
Beaverton, OR 97005
503-646-6699
Fax: 503-641-0946

— NOW ONLY \$1699.

1-800-344-7274

Copyright © 1992 E-Machines. All other products are trademarks or registered trademarks of their respective companies

AUSTRALIA PICA Pty Ltd TEL +61 2 674 6366 AUSTRIA Data World Austria TEL +43 732 230971 BELGIUM Ingram Micro TEL +32 2 722 95 11 CANADA Softcode Distributors Ltd TEL 416-477-5474 COLOMBIA MacStation TEL +571 257 4556 FINLAND Turtle Finland Oy TEL +358 0 4354 2930 FRANCE Ingram Micro France TEL +33 20 88 58 12 Interfax Technologies TEL +33 1 42 67 41 16 GERMANY Zero One GmbH TEL +49 951-98282 0 GREECE COMart Ltd TEL +301 923 2314 HONG KONG Tricom International Ltd TEL +852 375-0882 ICELAND PostMac Inc TEL +354 1 666086 IRELAND Typelec Ireland Ltd TEL +353 1 6798011 ISRAEL T.P.M. Systems Ltd TEL +972 3 5337655 ITALY Elcom srl TEL +39 481 536000 JAPAN Marubeni Corporation TEL +81 3 3282 3724 KOREA Chang Chun Commercial Co TEL +82 2 272 7673 MACAU Tricom Computer (Macau) TEL +853 515184 THE NETHERLANDS Ingram Software BV TEL +31 30 487111 Signal BV TEL +31 10 4139433 NORWAY/DENMARK AddOn A/S TEL +47 2 56 42 00 SINGAPORE Tricom Pacific Pte TEL +65 298-0123 SOUTH AFRICA Southern Microsystems TEL +27 11 792 8400 Strider Group TEL +27 11 804 3933 SPAIN & PORTUGAL Aaavaltun S.L. TEL +34 1 563 5939 SWEDEN LaserCad AS TEL +46 40 22 45 60 SWITZERLAND ALSYO TEL +41 32 23 54 65 TURKEY YESA TEL +90 4 431 7122 UNITED KINGDOM Heyden & Son Ltd TEL +44 81 203 5171 VENEZUELA Soluciones del Futuro S.A. TEL +58 2 242 7008

Paint Program

Kid Pix Companion 1.0

PROS: Adds clever new features to Kid Pix; includes the world's-easiest-to-use QuickTime movie and presentation modules. **CONS:** More complicated than the original program; slowish; requires lots of Mac horsepower. **COMPANY:** Brøderbund Software (415/382-4400). **REQUIRES:** Mac Plus; hard drive; System 6.0; Kid Pix. For color: Mac II; 2MB of RAM. For System 7: 2MB of RAM; 4MB of RAM for color. For QuickTime: 4MB of RAM; System 6.0.7. **LIST PRICE:** \$39.95.



TO MY MIND, A PERFECT PROGRAM, worthy of all five *Macworld* stars, brilliant in both design and execution, is as rare as a perfect diamond or a perfect day. Kid Pix is one. It's a colorful, noisy, ingenious paint program supposedly for kids, but captivating for everyone. My test panelists, down to age three, were so in love with the program that they had to be ripped away from it by their mothers.

Kid Pix Companion is a sequel of sorts. The innovative idea (which ought to be picked up by the makers of grown-up software): if you already own Kid Pix, you can graft new features onto your old program.

My worry was that once the Big Bad Marketing People started messing with Kid Pix, they'd disturb the delicate blend of whimsy and simplicity. The description of Companion sure makes it sound that way. It comes on four disks; the author of Kid Pix wasn't involved in the sequel; and the manual says that the program "was designed so that kids . . . can have fun with multimedia technology." Yikes.

Companion is indeed more complex than its predecessor, but not overwhelmingly so. Some of it merely supplements Kid Pix features—for example, it provides 112 new images for the rubber-stamp tool. Alas, many of them are either weird (a heavy emphasis on Middle Eastern culture), a bit intense (gravestone, skull), or so complex that you can't even identify the subject matter. (The figure at right shows three old stamps, on the left, and three of the new ones.)

The new features work much better. If you choose Color Me from the Companion menu, a dialog box appears (do three-year-olds know about dialog boxes?), from which you can choose any of 17 excellent line drawings to color in with the painting tools. Even better is the Draw Me command, where the program suggests something for you to draw, by both displaying a sentence on screen and having a gang of goofy voices read it out loud: "I'm a humungus fungus/with a hundred toes and a pickle in my nose/and I rock

the house. Draw me!" The company says that there are "literally thousands" of possible sentences, but in fact you start hearing recycled clauses after only a few times.

The Wacky TV is a QuickTime movie player (the rest of Kid Pix goes away while the TV is open). It's fun to play the 15 included minimovies (an average of about two



seconds long), which you can play forward or backward, speed up, stop, and start. You paste a movie into your Kid Pix painting, where it plays whenever you choose Play Movie from the menu.

The final piece of the Companion kit is a separate program called SlideShow: a presentation program for prepubescents. You assemble up to 99 "slides" (Kid Pix paintings or QuickTime movies) using a storyboard interface. Then you specify a sound, timing, and transition effect (dissolve, cross-fade, and so on) for each.

It's all perfectly charming, but Companion lacks the goof-proof personality of the original Kid Pix; think of it as Preteen Pix. If that's not a problem—to you or to your resident graphic artists—then by all means, convert your offspring into movie-making multimedia moguls.—DAVID POGUE

Removable Hard Drive

Quantum Passport XL 240

PROS: Fast; rugged; available in high capacity; superior software. **CONS:** Expensive compared with a standard hard drive. **COMPANY:** Quantum Corporation (408/894-4000). **REQUIRES:** Mac Plus; System 6.0.5. **LIST PRICE:** External chassis \$469; 240MB drive \$1099.



THE QUANTUM PASSPORT XL IS AN excellent piece of engineering designed to solve, for only a moderately discouraging amount of money, a specific data-transport problem. It solves the problem of how to carry data from one computer to another without buying a PowerBook or resorting to slower magneto-optical drives or lower-capacity cartridges. If you have, for example, a IICI at work and a Classic at home, you can carry the relatively small Passport XL drive cartridge back and forth between the two sites. You need to buy a drive chassis for each site but only one drive (choices are 50MB, 105MB, 120MB, and 240MB), and the Passport XL is fast enough to use as the only hard drive at each site.

To install the Passport XL, you simply plug in the external chassis as if it were just

another SCSI unit, turn it on, and insert the removable hard drive. An internal motor pulls the drive into the chassis. Quantum provides La Cie's Silverlining software (the best available) for formatting and mounting the drive—installation, remarkably enough, takes less than a minute.

The 240MB Passport XL drive I tested rates near the top of the pack in speed for midrange hard drives in the following tests: SCSI-write rate 1.975MB per second; read rate 1.31MB per second; and transfer rates on real files of 255K per second. Once installed, the drive is indistinguishable from a conventional fast hard drive, except that you can pop out the drive module.

Currently, an 88MB removable-cartridge drive costs about \$800, the cartridges cost \$110, and a 200MB portable external hard drive costs about \$1600. The other large-capacity data-transport solution, the rewritable optical drive, costs \$4000 to \$5000, with optical cartridges costing around \$250.

What can the Passport XL do for you, in the context of this market? The choice of drive-partition components (how much do you leave on the desk and how much do you carry around?) works in the Passport's favor at larger storage capacities. Compared with the 50MB and 105MB Passports, the 88MB SyQuest cartridge is cheap enough that you could buy one for each of two computers at

less than the price of two external Passport chassis and a 105MB drive unit, but at 200MB the Passport starts to yield a lower cost per megabyte. It is also unlikely that for simple home-to-office use you could afford to buy two erasable magneto-optical drives and shuttle the cartridges back and forth. The 240MB Passport unit is not only cost-effective storage, but it also, like all wee-designed removables, provides impressive security: other people can't see your hard drive files when you have taken them home in your briefcase. And the shockproof carrier for the Passport appears to be able to survive anything short of a plane crash (I drop-tested it from a variety of heights onto hard surfaces, with no data loss).

Quantum is the parent company of La Cie, which offers the same hardware (and software) under the Express name; La Cie's suggested retail prices average \$50 less on the chassis and smaller drives, but advertised dealer prices for the two systems are nearly the same. It remains to be seen whether the new fast magneto-optical drive from Pinnacle Micro (fast for a magneto-optical, meaning it's as fast as some small conventional hard drives) will arrive at a price that makes it an attractive alternative to the Passport scheme. The Quantum Passport XL, while not cheap, is a good value in fast, trouble-free, secure hard drive storage.—CHARLES SEITER

DateBook 1.0

PROS: Easy to use; well designed; flexible views of events; integrates with TouchBase. **CONS:** Printing is buggy and incomplete; not multiuser.

COMPANY: After Hours Software (818/780-2220). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 6.0.5; System 7.0 for integration; TouchBase 2.0. **LIST PRICE:** \$125.



DATEBOOK OFFERS A FLEXIBLE approach to event scheduling and to-do list management. Any item associated with a time is an event. To-do items can be prioritized and can be checked off when completed. Unchecked items can be automatically forwarded to the next day. DateBook has year, month, week, day, and customizable list views of your activities; you can enter data in any view. The Month view and Year view show the calendar and a resizable day-at-a-glance area listing events and to-do items. The Week view shows only events.

DateBook gives you extensive control over entering recurring events. The same event can occur every *x* number of hours, days, weeks, months, or years; on specific days of the month (such as the third Satur-

day); or on particular dates. You can set the number of occurrences, and the program can schedule recurring events to fall only on business days. If you have conflicting events, the conflicting dates are grayed out, signaling that you need to adjust your schedule. Unfortunately, DateBook enters recurring events in the data file as discrete items, with no links between them, so to change or delete a recurring event you have to modify each one separately.

DateBook has some innovative and unique user-interface features. Clicking on the month name in any view pops up the Date Selector menu. From this menu, you can move to any past or future date with one click. As you enter events, the program shades the appropriate segments of the day.

DateBook also has a small floating window showing the current day and time, along with an Alarm button and a New button. You can enlarge the window to view the date, today's events, and to-do's. You can page through to past and future dates and click on to-do's to mark them as complete.

Using System 7.0, DateBook has a two-way link via Apple events with After Hours' TouchBase address-book manager. Data from the TouchBase file is copied into the Description field in the DateBook entry screen. You can also make changes to data in DateBook, and post those changes back to TouchBase.

DateBook can print in a variety of day-planner formats, including Day-Timer and Filofax. However, printing has many problems and outright bugs. The most glaring problem is that you can't print the Description field. This is especially bizarre when you consider that TouchBase data is stored in this field. Other printing hassles include incompatibility with background printing and inappropriately small scaling of text sizes while printing some day-planner pages.

DateBook also has a crop of other bugs. If you are running DateBook from a disk other than the start-up disk, and an alarm goes off, DateBook crashes. Several users report difficulty using the TouchBase-to-DateBook integration, ranging from simply not working to crashes. And sometimes the screen does not redraw properly after a Find operation, or if you're running in 8-bit color, when you switch views quickly.

Although the manual refers to multiuser operation on a network, DateBook 1.0 works only in single-user mode. Due to last-minute problems, the company decided to release a single-user version; the package includes a note to that effect.

DateBook's printing problems and recurring-events awkwardness prevent a higher rating for now. But if After Hours delivers the promised goods with its maintenance release, DateBook will deserve a second look.—TOM NEGRINO

Nok Nok 1.0

PROS: Maintains log of attempted and successful connections to File Sharing; can determine identity of guest users; can set maximum connection time.

CONS: Expensive for large number of network users. **COMPANY:** Trik (617/933-8810).

REQUIRES: System 7. **LIST PRICE:** \$49.95; five users \$199; ten users \$349.



WHILE SYSTEM 7'S FILE SHARING feature has added new functionality to networked Macs, it has also introduced new security risks.

Nok Nok has four basic functions: alerting you when anyone connects to your Mac through the File Sharing feature; logging all attempts at connecting to your Mac; setting time limits for File Sharing users; and determining a guest's identity. In my tests, Nok Nok performed all these functions well.

If you want to keep track of all users who connect to your Mac, you can configure Nok Nok to alert you on every connection. The notification can be a dialog box showing the name of the user and the name of the user's Mac; a sound played from your System file; an icon flashing in the menu

bar; or System 7's File Sharing Monitor log. The File Sharing Monitor is particularly useful if you want to disconnect the user immediately (if you're getting ready to turn off your Mac, for example).

Nok Nok can also be configured to maintain a log file of all attempts to use File Sharing. This plain-text file stores the name of the user attempting to connect as well as the date and time of each attempt.

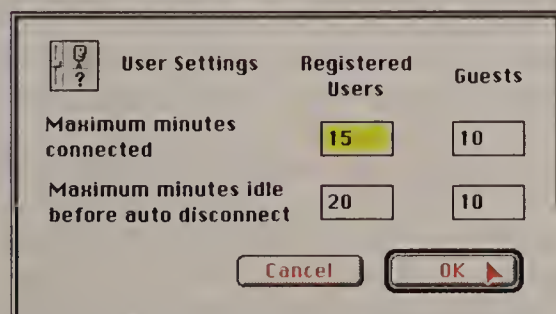
It's a common occurrence that once a user connects to a file server, that user often stays connected to the server until it's time to shut down. With System 7's File Sharing, a user might stay connected to your Mac (which acts as a server) all day even if he or she is not using any of the files on your Mac. That presents a security problem when the user is not in front of the Mac, since another, unauthorized user could use that Mac to access your files, possibly changing or

deleting them. To guard against that situation, Nok Nok lets you set a maximum idle time for any File Sharing connection.

Nok Nok lets you restrict the amount of time File Sharing users can stay connected to your Mac. A connected user is notified two minutes before the maximum time is reached, which is usually enough time to complete the current task and disconnect from File Sharing. If the user is still connected when the maximum time is reached, he or she is disconnected from your Mac. In System 7's File Sharing, you can authorize access to registered users who have access to many files on your Mac, as well as guest users, who have restricted privileges. Nok Nok allows you to set a different maximum connect time for registered users and for guests.

When a guest user logs on to your Mac using File Sharing under System 7, you know only that a guest is logged on; you have no idea who that user is. With Nok Nok, you get the name of the user and the name of the user's Mac. If the user's Mac is running System 6, you only get the Mac's Chooser name. Either way, the information is usually sufficient to determine who's using a guest account to access your Mac's files.

Nok Nok does a good job of plugging the security holes that File Sharing created in System 7. I'd recommend Nok Nok to anyone using the File Sharing feature of System 7.—DAVE KOSIUR



The Nok Nok configuration options include setting different idle times for registered and guest users.

Expert Systems Software

NueX 1.1

PROS: Neural-network simulator is useful as an educational tool. **CONS:** Too slow and incomplete for practical expert-system development; expensive.

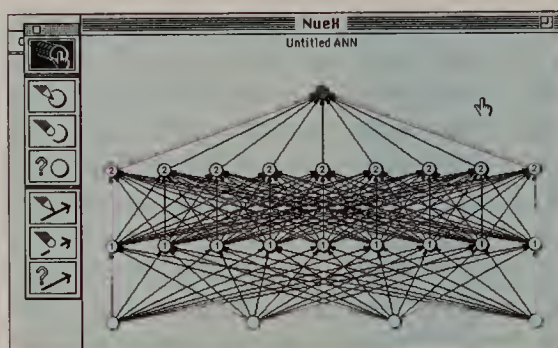
COMPANY: Charles River Analytics (617/491-3474). **REQUIRES:** Mac Plus; 4MB of RAM; System 6.0. **LIST PRICE:** Version 1.2 \$295.



NUEX AIMS TO MARRY ARTIFICIAL neural networks (ANNs) and knowledge-based expert systems (KBs) to let you create "intelligent" applications. Rule-driven KBs use preprogrammed true/false tests to analyze input data and arrive at one or more preordained conclusions. Data-driven ANNs use pattern recognition and weighted probabilities to analyze input data and "learn" to classify that data into categories. Combining the two makes possible sophisticated expert systems that can adapt to varying input data while still analyzing that data using a set of deterministic rules.

NueX is a HyperCard-based shell that provides both ANN and KB functions. The package includes the NueX main stack, a number of simple examples, and a rather thin user guide. Inside the main NueX stack

are several components. The neural-network editor lets you create ANNs that are modeled by a C-based ANN simulator built into the NueX stack. A data editor (Apple's TeachText) lets you enter training data in the form of expected inputs and outputs. The ANN Monitor passes the training data through the network iteratively so the ANN can learn the input patterns and expected results. A logarithmic graph displays the effectiveness of each training cycle, letting you monitor how reliably the ANN produces correct output. The other side of NueX—its KB expert-system component—consists of a rule/fact editor and an inference engine. NueX's rule language uses HyperTalk syntax, although you don't need to understand HyperTalk to use the KB. You use the



Neural Net NueX lets you construct and train both neural networks and knowledge-based expert systems. Shown here is NueX's graphic depiction of a three-level neural network.

rule/fact editor to enter KB rules and general facts; you then run the inference engine to analyze input data using those rules and facts, yielding a predicted output.

While NueX is certainly complex, and even educational, it's not ready for prime time as a serious production tool. First, its HyperCard foundation limits its speed—even on an accelerated Mac IIci, NueX is painfully slow. Second, the two sides of NueX—neural network and expert system—are woefully unbalanced. The ANN tools are fairly complete and easy to use, although relying on TeachText as a data-input editor is a definite cop-out. The KB tools, though, seem to be an afterthought: they're far less sophisticated than those in competing, but much cheaper, expert-system products. The documentation, too, is uneven and incomplete—delving into neural-network theory to the point of discussing differential equations, while glossing over such issues as how to handle symbolic input. Tutorials are simplistic and don't adequately explain various NueX components, such as the ANN training graph. Finally, all of the examples provided are trivial; users of a professional-level product require usable templates.

As a lightweight intro to neural networks and expert systems, NueX has some merit, although its price makes it unattractive for educational purposes. But for practical use, it's impractical.—MEL BECKMAN

Network Calendar Program

Now Up-to-Date 1.0.1

PROS: Fast; easy to learn; colorful displays; surprisingly bug-free for an initial release; good variety of printing options. **CONS:** Lacks to-do list feature; no word wrap in monthly calendar.

COMPANY: Now Software (503/274-2800).

REQUIRES: Mac Plus; hard drive. **LIST PRICE:** \$99; five-user pack \$399; ten-user pack \$599.



THOUGH LESS THAN A YEAR OLD, Now Up-to-Date has become one of the most popular calendar programs for the Mac. It's not hard to see why.

Now Up-to-Date's swift performance and logical structure make it exceedingly easy to use. And while networked users may find setting up the program's public, or shared, calendars a bit complicated at first, solo users probably won't even have to touch the manual.

Up-to-Date has terrific graphic appeal—especially on a color screen. Upon start-up, a spacious monthly calendar appears in a resizable window. You can also open weekly or daily views of your schedule and consult the two views simultaneously. In all the views, you can customize the

calendar's fonts, styles, lines, and colors to suit your preference.

Entering data is fast and hassle-free, thanks to keyboard shortcuts. You can add new events or appointments to the calendar in any view. Double-clicking on the name of an event opens an Event Info window, in which you can set the duration of the event and assign it either to your own personal calendar or to a shared network calendar. There are options for setting alarms, creating recurring events, and adding detailed comments of up to 255 characters.

To mark longer stretches of time on your calendar—several days, or even a week—you can create banners, which can be resized and stretched across your monthly calendar. For general reminders, you can add notes to the calendar.

Over a network, Up-to-Date users can post events, banners, and notes to any number of public calendars, which are stored on the calendar server Mac and shared by other users. Users can assign unique colors and text styles to their views of a shared calendar to make identifying events easier.

Up-to-Date's Appointment Book program provides an outstanding variety of printing options. Daily, monthly, and weekly schedules can be printed out in three different appointment book sizes. You can print calendar views containing up to four months on each page, or you can create tiled

wall calendars up to 3½ by 3 feet.

Up-to-Date has a few deficiencies: there's no word wrapping of event text displayed on the monthly calendar, so appointment listings are always cut off abruptly after the first few words. Events shorter than 30 minutes are unreadable in the daily view because they're scrunched into slivers on the time line. And events in Up-to-Date must always be rounded off to quarter-hour intervals; events can't begin or end at, say, 2:20 or 3:55.

Finally, there's one glaring omission. There's no way to list and prioritize general to-do items—an indispensable part of any comprehensive daily planner. Though Up-to-Date lets you save events without displaying a specific time in the monthly view, it always assigns a default time to them in the daily view. Likewise, when you export Up-to-Date data as a text file, all events are assigned a time, even if you've checked No Time in the Event Info dialog box.

Still, this is an outstanding calendar. And for a 1.0.1 version, it's polished and bug-free. According to the company, version 2.0, due out in the fall, will include a to-do function and a list view that will display to-do items alongside the daily schedule. The company also says that in version 2.0 each date cell on the monthly calendar will have word wrap and be scrollable.

—JOSEPH SCHORR



Trade Up
To The Top
Rated DOS
File Utility
For Only
\$24⁹⁵

A Limited Time Offer

All it takes to trade up is **\$24.95**, and a proof of purchase for DOSMounter or Mac PC Exchange. Upgrade to the best DOS file utility on the Macintosh. For those who don't yet have a DOS file utility, we have a special one-time offer to purchase AccessPC for just \$49.95.

Name _____ Company Name _____
Address (street address only, no PO Box) _____
City _____ State _____ Zip _____
Day time phone (area code _____) _____

I own the following program: ☐ Apple Mac/PC Exchange ☐ Dayna DOSMounter
Serial # _____ Signature _____

For the first 1000
orders, we will
include a coupon
good for 50% off
the list price of any
SoftPC product.
Limited: 1 per customer

I wish to Trade Up:
Qty _____ x \$24.95= _____
Sales tax _____
Shipping _____ (\$4 per item.
UPS ground)
Total Order Amount _____

(CA,MA, FL and GA residents add applicable sales taxes)*

I wish to Purchase:
Qty _____ x \$49.95= _____
Sales tax _____
Shipping _____ (\$4 per item.
UPS ground)
Total Order Amount _____

(CA,MA, FL and GA residents add applicable sales taxes)*

☐ Check† ☐ VISA ☐ MasterCard ☐ American Express

Credit Card # _____

Expiration date _____

Cardholder name _____

Signature _____

† Mail order form and check payable to:

Insignia Solutions Inc. 526 Clyde Avenue, Mountain View, CA 94043

**To order by phone, call
1-800-955-9797**

Or fax this form (credit card
purchases only) to
(415) 964-5434

Satisfaction Guaranteed

* Orders must include sales tax for ship-to location. Allow 2-4 weeks processing time. Offer good only in the U.S.A. through 9/30/92 to registered owners of one of the products listed above. Price and availability subject to change.
© 1992 Insignia Solutions Inc. All rights reserved. SoftPC and AccessPC are registered trademarks of Insignia Solutions Inc. Other product names are trademarks or registered trademarks of their respective holders.



Now, MS-DOS Files Can Look Just Like Mac Files.



With AccessPC®, you just pop any DOS floppy in your drive, and in a couple of clicks, what you see on your desktop are Mac files.

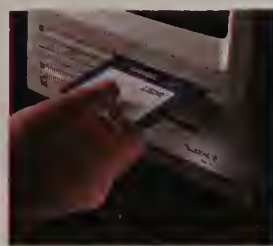
And they not only look just like Mac files, they act just like Mac files in Mac applications.

You can edit, copy, save, print, play with the numbers, print again,

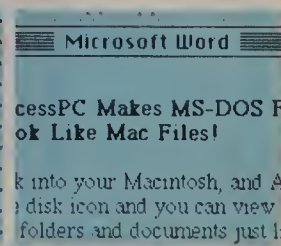
AccessPC is System 7 savvy as well as completely compatible with Apple's System 6.

and give the PC folks back their diskette.

AccessPC is so easy to use, it gives new meaning to the word *utility*.



Put MS-DOS disks in your SuperDrive, double-click on the DOS file, and open it in your Macintosh application.



Plus, it includes powerful Multi-Driver™ and Media Formatter™ utilities, *free*. You get instant compatibility even with DOS removable cartridges and optical drives. And you can get access up to ten times faster than with other utilities.

Pick it up today. You'll be amazed at how such an inexpensive little utility can make you look so good.

Insignia Solutions™
Bridging Worlds Of Software™

Insignia Solutions Inc., 800-848-7677. 526 Clyde Avenue, Mountain View, CA 94043. FAX (415) 964-5434. Call (415) 694-7600.

Insignia Solutions Ltd., Bellfield House, Bellfield Road, High Wycombe, Buckinghamshire, HP13 5HP, UK. FAX +44 494-459720. Call +44 494-459426.

AccessPC and SoftPC are registered trademarks and Multi-Driver and Media Formatter are trademarks of Insignia Solutions Inc. All other product names are trademarks or registered trademarks of their respective owners.

Circle 235 on reader service card

Network-Administration Utility

RouterCheck 2.0

PROS: SNMP checking; excellent user interface; continuous network polling. **CONS:** Expensive for small networks. **COMPANY:** Neon Software (510/283-9771). **REQUIRES:** Mac Plus; System 6.0. **LIST PRICE:** \$895.



GATORBOXES AND ETHERROUTES and FastPaths, oh my! So goes the lament of the network administrator who must daily face the challenge of monitoring a busy multiple-network system, or internet. Those electronic beasts known as routers break up a large network, into an internet of zones that then use the routers to communicate with one another. This speeds up network processes such as printing, E-mail, and server access by creating a smaller area for data to travel. Routers can also provide translation services between different network protocols (AppleTalk to Ethernet, for example). But keeping track of routers and the traffic they process—especially if the mechanisms come from different manufacturers—can drive you round the bend.

RouterCheck 2.0 is compatible with any Phase 2 AppleTalk router, both hardware

and software. For RouterCheck to collect detailed information (beyond simply the zone list), the router must support SNMP protocol. It provides cross-vendor router accessibility with a much improved user interface over that of its previous version. It also provides real-time monitoring of the network via SNMP (Simple Network Monitoring Protocol), constantly polling the routers to ensure that network traffic stays at an optimal pace. If bottlenecks or other zone problems do occur, you can correct them either by resetting the router via the RouterCheck application or, for more intricate operations, by using the router's native configuration software.

RouterCheck begins by scanning the internet for routers and collecting some basic information such as the internet and zone numbers, and the brand name of each router. It then displays a router list from which you can obtain additional detailed information by double-clicking on the names of listed routers. This information includes vendor-specific data such as software version and PROM numbers, and network-specific information such as zone location, net and node identities, and the routing table (a list of all the networks it sees). This first search can take a few minutes or a few hours, depending on the number of routers in the internet. You can save this router list to track changes to the network.

Version 2.0 adds two excellent polling and monitoring features. You can now set RouterCheck to poll routers to see which ones are working and which ones are down, and to watch for changes in network traffic speed and zone lists. RouterCheck keeps a log of this traffic information, and when suspicious activity occurs (such as a new zone appearing or traffic slowing down), the software can notify you in a number of ways, including an on-screen message, an alert sound, or a pager via Ex Machina's Notify software. Dialog boxes suggesting possible reasons for suspicious activity are another excellent new feature.

At \$895, RouterCheck is too pricey for most tiny internets (one to four routers). That's unfortunate, because the wealth of information RouterCheck provides would be useful for managers of small internets and for newcomers to network management. A lower-price version with an upgrade path would be a great addition. On the other hand, the only limitation to the number of routers that RouterCheck can monitor is the capacity of the administrator's Mac. Larger internets require more memory and disk space to compile and save reports. For mid-size to larger internets, RouterCheck is a must. It keeps your finger on the pulse of your router configurations and internet traffic—and keeps your pulse in check.

—MATTHEW R. CLARK

Foreign-Language Reader

Transparent Language 1.04M

PROS: Simple to use; inexpensive; minimal system requirements; single program reads multiple languages. **CONS:** No word-count feature; no print feature. **COMPANY:** Transparent Language (603/465-2230). **REQUIRES:** Mac 512K; System 6.0. **LIST PRICE:** Three stories in French, German, or Spanish \$139; three stories in Latin \$129.



MANY FACTORS ARE INVOLVED IN learning and retaining a foreign language—first acquiring the accent, vocabulary, and grammar, and then practicing those elements through conversing, listening, and reading. Transparent Language addresses just one part of that process—reinforcing foreign-language skills through reading.

This is a program without an iota of glitz or glamour. And though I'm as charmed as the next person by the Mac interface, I am completely undisturbed by Transparent Language's lack of sound, graphics, color, or even buttons. For a 125K application that enables me to read stories in French, Spanish, German, Latin, and Italian—one program—I'll do without.

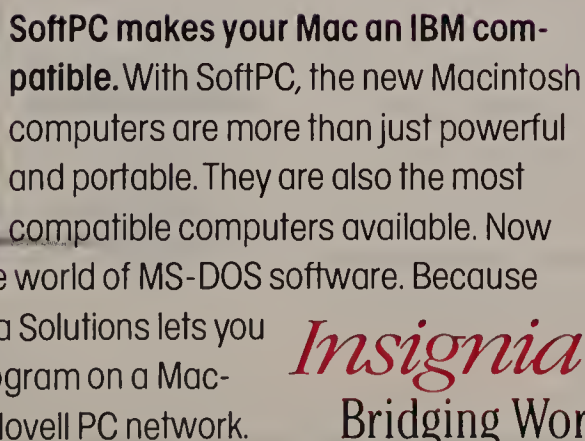
If you install stories in several languages, all are available from a single Open New Title command, although you can open only one story at a time. The main screen is simply a scrolling text window containing the story. It is surrounded by five smaller windows giving the meaning of each highlighted word, the phrase in which it appears, the whole sentence or clause, plus any comments or notes the translator chooses to include. For example, the German phrase *die Katze im Sack zu kaufen* (underlined to indicate that it's idiomatic) translates literally to "to buy the cat in the sack," but it correlates with the English expression "to buy a pig in a poke," meaning to accept something sight unseen. In another story the interpreter explains that the Spanish verb *se había turbado* is in the pluperfect tense, formed from the past participle of *turbarse* (to become upset) and the auxiliary verb *haber* (to have). Using the Root Search command, you could look for all verb tenses formed with *haber*, or use Word Search to locate other pluperfects formed with *había*. For help working through long or complicated sentence structures, you can choose Underscore Segment. You can also place and find bookmarks, helpful for studying lengthy works.

You can move and resize any window, change its font and point size, and close or open it via the pull-down Show menu or keyboard commands. Most of the ⌘-key

combinations deviate from Macintosh standards and are instead mnemonic—⌘-W is the toggle for the Word Meaning window, for example, and ⌘-P is for Phrase Meaning. But since most of the normal Mac commands don't apply (you can't print stories or windows, for instance), this poses no real problem. The commands for Open, Quit, and Help are standard.

The technology underlying Transparent Language works with any Latin character-based language; availability of translated works is the only limitation. The company continues to build its catalog and expects to add new languages in the future. For now, its offerings include works in French by Balzac and Baudelaire, in German by Kafka and E.T.A. Hoffmann, in Spanish by Cervantes, in Latin by Cicero and Catullus, and one short Italian story by Manzoni. Most full-length titles run roughly 25 to 50 printed pages and cost from \$12.95 to \$29.95. Optional audiotapes are also available (from \$5.95 to \$9.95).

The program has no facility to test a student's vocabulary or comprehension, which some may regret. I would have liked a word-count feature to help gauge progress. But these are minor quibbles and not really part of Transparent Language's simple, clear-cut mission. This is a superb tool for bolstering language skills through reading.—MARJORIE BAER



It's simple. Just load SoftPC and an IBM window appears on the screen. There's no hardware installation required. It's like having two computers in one.

848-7677. We'll answer all of your questions, and show you how your next IBM computer could be Macintosh.

*Insignia Solutions*TM
Bridging Worlds Of SoftwareTM

SoftPC is completely compatible with Apple's System 7 software. SoftPC is a registered trademark of Insignio Solutions Inc. All other product names are trademarks or registered trademarks of their respective holders.

Circle 72 on reader service card

THE RASTEROPS CORRECTPRINT 300. ITS OUTPUT IS YOUR INCOME.



IMAGE RETOUCHING



PACKAGE COMP



POSTER LAYOUT



PRESENTATION OVERHEAD

THE \$8,999* RASTEROPS CORRECTPRINT 300.

The RasterOps CorrectPrint 300 is the truly affordable photorealistic color printer that's as good as gold.

It saves you time and money because you no longer have to send out for color prints.

And its beautiful, high-resolution output helps you sell your ideas more successfully.

Whether you use the RasterOps CorrectPrint 300 for presentation overheads, layouts, comps or image retouching, its output will ensure your ideas don't go flat on paper.

This high quality color printer is 300 dpi PostScript™ language compatible and network ready.

The RasterOps CorrectPrint 300.

Things have never looked so good for your business!

Call 1.800.SAY.COLOR for the dealer nearest you.



RASTEROPS®
THE ART & SCIENCE OF COLOR™

The Department of Music Education

BY DAVID POGUE

YEAH, YEAH. THE MAC IS THE musician's computer. We all know that every jingle is recorded, and every Broadway show tune published, and every movie sound track assembled, by Macintoshes. The music pros are in heaven. Good for them.

But what about the wannabes? What about the 11-year-olds coming home from school and having to choose between practicing piano and Super Mario Bros. on the Nintendo? Or the 60-year-olds coming home from work and wanting to pick up where high-school band left off? Or the in-between-year-olds who just want to learn a little music without making it a big expensive federal case?

Due to the tragic perception that music on the Mac is a niche market (read: not profitable), most music-instruction products have a decidedly homemade feel. Most are created and marketed by one person. Fortunately for the future of America's choirs, bands, and symphonies, there are still some standouts.

The Miracle Piano Teaching System

IF YOU HAVE SEEN THE ADS ON TV, you already know that this product is not put out by any one-man operation (Software Toolworks, \$499.95). It has its faults and foibles, but it's thoroughly modern, assumes no prior knowledge, and has enough lessons to keep you busy for a year.

The Miracle is an electronic MIDI keyboard that connects to the Mac. The software listens to what you play, gives feedback, points out your mistakes. (MIDI comes up in every discussion of the Mac and music, including this one. MIDI, pronounced *middy*, is the electronic language—and the physical connector—that a Mac and a synthesizer use to communicate. Like PostScript, only musical. A MIDI file is a generic music document, like a word processor's text file.) For more on The Miracle system, see *Reviews* in this issue.

Compose Yourself

THIS ECCENTRIC COLLECTION OF FOUR tools—a manual, two cassettes, some HyperCard stacks, and a *sequencer* (a

program that records anything you play on a MIDI synthesizer)—is dedicated to teaching what's unteachable: how to compose music.

The cornerstone is the manual, a lovingly prepared unveiling of the author's personal observations and secrets for composing (MacBeat, \$99). The beginning chapters make a cursory attempt at teaching music theory, appreciation, and notation—but don't be fooled; it's way over the heads of nonmusicians. If you are a musician, you will indeed find some inspirational nuggets, and I can imagine one or another of the 66 composing ideas described in the Strategies stack bumping even a seasoned pro out of a rut. Bag the crude sequencer, though, and don't bother with the dozens of recorded musical examples on disk—they're improvisatory noodlings, wrong notes and all, more desultory than illustrative.

Jazz Through MIDI 3.5

AT FIRST, YOU MIGHT THINK THAT THIS typewriter-produced, unproofread, cut-and-pasted book is an ordinary Jazz-for-Klutzes textbook, complete with opaque sentences like "To find the Tritone substitution for any chord count three whole steps from any dominant seventh." But then you listen to some of the musical examples—two disks full of absolutely sizzling jazz, blues, and Latin MIDI files—and your jaw begins to drop. Using a sequencer program like EZ Vision, Pro 4, or Performer, you can slow down these exquisitely recorded pieces (piano, bass, drums, and vibes are on separate tracks), and follow the included sheet music, until you understand how the jazz greats do it. It's assumed that you have a good MIDI synthesizer and a sequencer program, and that you already play the piano. If you want to learn jazz, you may get a lot out of this crude but effective Music Minus One for the cellular-phone set (New Sound Music, \$49.95).

The Book of MIDI

IT IS A WHOPPING 3-MEG, 310-card HyperCard stack

that introduces you to MIDI (Opcode Systems, \$39.95). Some of it makes incredibly clever use of HyperCard. For example, in the excellent chapter on classic old synthesizers, you get to hear a two-second snippet of each keyboard being played. And the how-to-wire-your-home-studio section is perfect: animated cables snake through the diagram one at a time, leading you through that hairy process blow by blow.

Ironically, I doubt you'll learn much about MIDI. It's one of those irritating texts that regurgitates technically correct sentences without making them meaningful: "The first bit of a byte defines the byte as either a status or data byte, and is called the Most Significant Bit (MSB)." Um, yeah. I was gonna say that.

There's a little bit of hypertexty stuff—you know, where you click on a boldface term and a definition pops up. Trouble is, definitions in this book don't actually pop; instead, when you click on a term, you're taken to another card in the stack, where the definition contains *other* obscure terms. By the time you have a decent understanding of the original term, you've traversed cards all over the stack, and you've long since lost your place.

MidiSchool

NEVER HAVE THE TECHNICAL BAFFLEMENTS of MIDI been so lushly illustrated—both musically (if you have a synthesizer connected) and graphically (thousands of drawings and cartoons)—as in this gorgeous 219-card HyperCard stack (EduActive, \$119). Unfortunately, the text doesn't live up to the graphics' high standards; while difficult concepts are sometimes cleverly explained ("MIDI has channels, just like your television"), an equal number are tossed out without regard for the beginner ("Use a MIDI cable rather than a 5-pin DIN, or it is likely to cause a ground loop"). And the fact that two of the three main section titles feature AWOL apostrophes foreshadows the punctuation problems that occasionally follow.

continues



*The Macintosh
now does
everything but
make
you practice*

Still, writer/illustrator/programmer/marketing department Paul Keefe has put enough polish into this stack to win it a spot on any music teacher's desk. The program can track the individual progress of many students; there are two interesting (but somewhat lame) built-in MIDI programs, including a sequencer; and the electronic Administrator's Notebook gives the instructor a degree of control over the proceedings. Best of all, it's impossible to get lost in this stack; the navigational controls are crystal-clear.

An Intro to MIDI 1.1

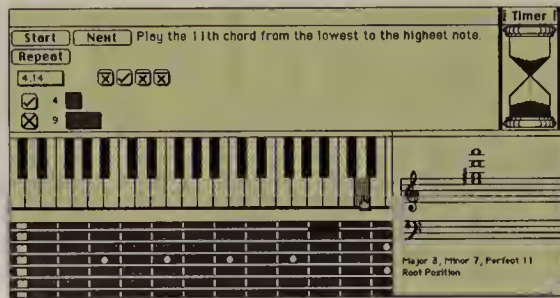
THE LAST IN THE STACK OF STACKS IS this 88-card shareware offering (\$15 requested; I found it on America Online). It's not nearly as complete as the commercial MIDI stacks; it has no illustrations, sounds, or MIDI features; and this text, too, is afflicted by CRAMPS (careless-random-apostrophe-mistakes-by-programmers syndrome).

Even if tough MIDI concepts aren't much better explained for the beginner, the writing tone is friendlier than in the other stacks. And this stack costs next to nothing to download (transfer) to your Mac; you may as well peruse it to see if HyperCard MIDI training is your cup of techno-tea.

Adventures in MusicLand 2.0

THIS PACKAGE CONTAINS FOUR CUTE, colorful guessing games that involve music and sound (Dr. T's Music Software, \$79). Two of them are like the old "Concentration" TV show; you have to remember the locations of face-down musical cards. In Picture Perfect, you're shown one small section of a composer's face (or an instrument, or a musical symbol) at a time, and you're supposed to identify it by typing. And Melody Mixup is like that cumulative-memorization game for long car rides: "I'm going on a trip and I'm taking an Armadillo, a Bongo, and a Cucumber . . . your turn!"; except that you have to play back increasingly long sequences of musical notes.

Two problems. First, the novelty wears off fast. In Sound Concentration, for example, there are only eight sounds (dog barks, glass breaking . . .), no matter how many times you play. Second, I couldn't figure out whom these things are for. Adults? Then there needs to be a gazillion times more variety. Kids? Give it up—no ten-year-old I know could come up with answers like *mordent* and *Mendelssohn*. Oh, sure, some of the games, using certain program settings, might be educational and fun for anyone. But the 20-second credit sequence plays, unstopably, every time you change games.



Listen Up Listen's primary windows include a piano keyboard, guitar fretboard, notation staves, and an instruction/scoring window. As you play each note of a chord, the X or check-mark icons in the instruction window indicate whether you were too high, too low (as shown above), or right on the nose.

Listen 2.1.2

THE LISTEN PROGRAM, SAYS ITS MANUAL, "is not intended to replace a full course in melody and harmony." Precisely so; but if you have a book or a teacher to spell out the basics for you, I can't imagine any better way to practice sight-reading, ear training, and note recognition (Imaja, \$99). As Listen plays each note, you get triple sensory reinforcement: how it sounds, how it looks on paper, and where it is on the keyboard (or fingerboard). You can use either the built-in Mac speaker (and select from dozens of instrument sounds), an attached MIDI keyboard (incredibly useful), or both. This is the only drill program you can control by pressing specific synthesizer keys—which activate various on-screen buttons by remote control—so that you're not continually scooting back and forth from desk to synth.

Every kind of drill is included (intervals, chords, melodies, scales), and everything is customizable (what range of notes to use, whether or not you want a timer, how many notes in a chord, and so on). Too bad there's no rhythm training and not much in the way of note-reading drills. An un-copy-protected version (2.1.3) is supposed to be available by the time you read this.

Practica Musica 2.322

EXCEPT FOR THE MIRACLE, PRACTICA Musica (Ars Nova Software, \$125) is the only self-contained Mac music teacher, thanks to the 200-page textbook that comes with it. (The other drill programs assume that there's a third party presenting the material to begin with.) With a minimum of jargon and myriad examples, this book covers it all: theory, notation, harmony, chords, intervals, tunings, rhythm, composition, and just enough history to keep things spicy. Sprinkled through this concise text are instructions for applying what you've just read to exercises in the software, so that the drills have context.

The program uses either built-in Mac sounds or a MIDI instrument. Unlike Lis-

ten, Practica Musica emphasizes reading music, and its ear-training examples use actual melodies instead of computer-generated note strings. The pitch and rhythm training drills are particularly cooperative: you paint pitches (or rhythms) onto a staff, and the program supplies the rhythms (or pitches) automatically. The program doesn't look as good as it works, though; it has crudely-drawn musical notation, nonstandard scroll bars, and a few other clunky interface elements. (The author says that version 3.0, now in development, will be gorgeous.)

MiBAC Music Lessons 1.1

IN ANOTHER ERA, ON ANOTHER COMPUTER, this might have been a great drill program (MiBAC Music Software, \$119). It shows a piano keyboard and a single staff. The program plays exercises using either the Mac speaker (no choice of sounds) or MIDI. It has 11 drills, from key-signature recognition to scale-naming. It's an easy-to-use, absolutely literal, electronic edition of the ear-training and theory drills you took in college.

But Music Lessons left me disappointed. There's no melody ear training, no chord drills, no inversion tests. When you play answers on the MIDI keyboard, the program marks as incorrect any notes you play that fall outside of a limited keyboard range. The whole thing feels a little leaden, partly because it takes so long for the program to cough up the answers (and the next drill), and partly because there's so little spark or variety.

The Upshot

THERE'S NO QUESTION THAT COMPUTERIZED music lessons are superior (livelier, more illustrative) to the ones in self-study books. They even have certain advantages over classes: you control the pace and the difficulty, for example, and the feedback on drills is instantaneous. But without a teacher, the mighty burden of motivation falls back into your lap. If you think you're self-disciplined enough to stick with it, here's what I'd tell you.

To learn piano, get The Miracle. To learn to read music, get The Miracle or Practica Musica. To cultivate your ear and reinforce your music theory, it's Practica Musica or Listen. To learn MIDI, start with Intro to MIDI; buy MidiSchool if you're still curious. And then remember what the New York City cop told the tourist who asked how to get to Carnegie Hall: "Practice." **m**

Contributing editor DAVID POGUE is the author of *Macs for Dummies* (IDG Books Worldwide, 1992). He has been the MIDI guru, conductor, or music copyist for several Broadway musicals.

New MacTools® 2.0. The First Data Protection That's Automatic.

PROTECT AND REPAIR DATA
WITHOUT EVER
HAVING TO THINK TWICE.

MacTools® 2.0 is the first automatic data protection program

F·A·S·T·F·A·C·T·S

DATA RECOVERY

Automatic Disk Analysis
Automatic Disk Repair
Automatic Directory Mirroring
Tracks Deleted Files

ANTI-VIRUS

Automatic Detection
Automatic Network Updates
Automatic Protection
Automatic Cleaning

BACKUP

Automatic Tape Backups
Automatic Network Backups
Backup/Optimize Reminders

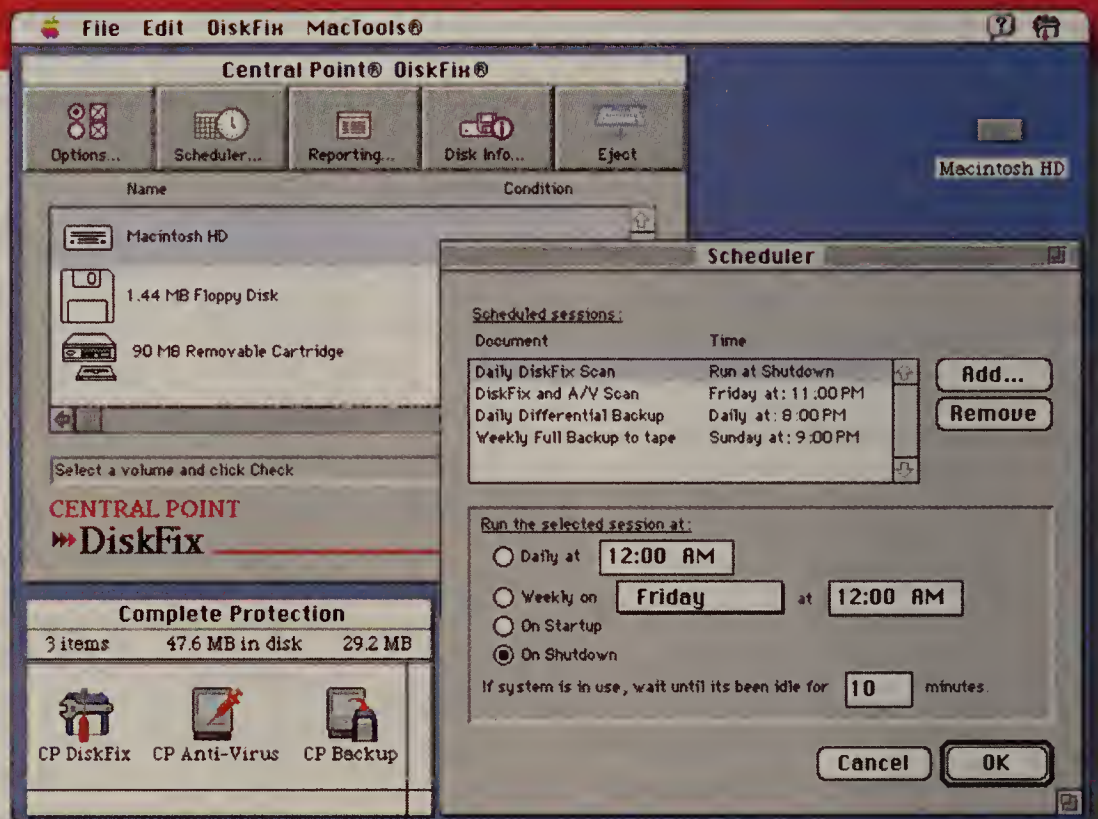
\$59* COMPETITIVE
UPGRADE

with integrated
virus protection,
backup and data
recovery.

And to make
sure that today's
minor disk prob-
lems don't turn
into tomorrow's
disasters, Mac-
Tools is the only
data protection

package that offers scheduled
disk analysis and repair.

New MacTools automatically
detects and removes known viruses
and protects your computer from
unknown viruses.



When it's time for you to
backup, MacTools can use tape
or network drives at the times
you schedule. And it will even
remind you to back up to disks.

MACTOOLS 2.0 HELPS MAKE EVERY MANAGER'S JOB A LITTLE EASIER.

Just configure MacTools once for
your entire group, then customize
it for individual users. And only
MacTools can
recover data from

damaged Excel files. It also re-
covers deleted files.

Upgrade to MacTools 2.0 from
MacTools Deluxe for only \$49*,
a savings of \$100. Just call us at
the number below. If you own any
other Macintosh utility, upgrade
for \$59* by calling the same num-
ber or visiting your local dealer.

The rest is automatic.

**CENTRAL POINT
MACTOOLS**

Automatic and Complete Data Protection

DATA RECOVERY AND DISK PROTECTION
• Automates disk analysis and repair
• Repairs damaged disks
• Recovers deleted files
• Restores lost and hidden files
• Optimizes hard disks
COMPREHENSIVE VIRUS PROTECTION
• Prevents virus infection
• Detects and removes viruses
• Prevents virus spreading
SAFELY SHUT DOWN
• Supports hard drives, networks,
• Supports removable storage
• Supports backup
• Creates data-compressed backups



1-800-947-9445

Central Point Software, Inc.

marks used for identification purposes only.

© 1992 Central Point Software.

MacTools is a registered trademark of Central Point Software. Names of other companies' prod-

*Plus \$6.00 shipping and handling.

Circle 275 on reader service card

New Products

The Latest Macintosh Releases

EDITED BY EVAN COOPER

THIS SECTION COVERS
MACINTOSH
PRODUCTS FORMALLY
ANNOUNCED BUT
NOT YET EVALUATED
BY MACWORLD.
ALL PRICES
ARE SUGGESTED
RETAIL. PLEASE CALL
VENDORS FOR
INFORMATION
ON AVAILABILITY.

HARDWARE

AsantéHub 1012

An intelligent 10BaseT hub with an RS-232C port that allows for out-of-band network management via modem using included AsantéView software. The product also has an RS-485 port and LED status displays for network monitoring and troubleshooting. It is equipped with 12 RJ-45 ports, a 50-pin RJ-21 connector, and a 3-in-1 port that includes BNC, RJ-45, and AUI connectors. With out-of-band management \$1499; with in-band and out-of-band management \$1999. Asanté, 408/734-4844, 800/662-9686; fax 408/752-8372.



AsantéHub 1012

AT-MR113

A dual-port 10BaseT microrepeater that links two full-length 10Base5 network segments via standard AUI ports. Has full 802.3 repeater capabilities, network status LED indicators, and protection from malfunction for both network segments. The device uses an

Ethernet repeater ASIC designed by the company. Network protection includes an autopartitioning and autoreconnection capability that disconnects a segment showing excessive collisions; a jabber lock-up protection feature isolates nodes that are transmitting packets no longer allowed by IEEE standards. Network status LEDs include indicators for power, collisions, and transmission. \$795. Allied Telesis, 415/964-2771; fax 415/964-1598.

Audiomedia II

A stereo, CD-quality recording system that includes a DSP NuBus board and the company's Sound Designer II software. The board contains a Motorola 56001 DSP chip running at 33MHz for all audio processing functions and has RCA-type analog connectors and S/PDIF digital connectors, making it compatible with consumer DAT recorders. The software's features include nondestructive playlist editing, SMPTE synchronization, real-time digital EQs, and pitch shift with time correction. \$1295. DigiDesign, 415/688-0600, 800/333-2137; fax 415/327-0777.

Cirrus Optical

A 128MB magneto-optical disk drive that takes 3 1/2-inch cartridges and uses a Panasonic mechanism. La Cie says the drive has a 38ms average seek time and a throughput of 640K per second. It has external termination and SCSI ID switches, and includes the necessary cabling, Silverlining hard drive management software, and 5MB of public domain software. \$1699. Additional cartridges are \$99 each. La Cie, 503/

520-9000, 800/999-0143; fax 503/520-9100.

ColorWorks

A family of LCD projection panels that let users show images from a computer using an overhead projector. The devices are available with a 9-inch or an 11-inch panel and can project up to 24,389 different colors with a contrast ratio of 20:1. Panels weigh 6 pounds each and are compatible with the company's Cyclops pointer system. 9-inch panel \$3995; 11-inch panel \$4995. Proxima, 619/457-5500; fax 619/457-9647.



ColorWorks

CP-503

A plain-paper laser plotter that plots A- and B-size drawings and has a 400-by-400-dpi resolution. The company claims the plotting speed is 8 ppm for A-size media and 4 ppm for B-size. An auto-scale feature lets users reduce D- and E-size drawings to A- and B-size without having to reconfigure the software driver. The plotter is compatible with HP-GL, and has 6MB of RAM and RS-232C and Centronics interfaces; it uses a TI34010 controller with a clock speed of 60MHz. \$8495. Mutoh America, 708/952-8880; fax 708/952-8808.

DigiLINK

A high-speed, 128K-per-second digital bridge that can link any number of remote Ethernet networks to each other via ISDN telephone lines. The device has an Ethernet adapter and an ISDN ter-

minal adapter built in and supports 10BaseT and 10Base2 connections for Ethernet, and RJ-45 cables for ISDN connections (an NT1 network terminator is required). The DigiLINK can transmit Ethernet data over one or both B channels of an ISDN line and can be configured via the serial port of a Macintosh; administration software that supports Apple events is included. \$3495. Sonic Systems, 408/736-1900; fax 408/736-7228.

Floptika 20/M

A SCSI floptical disk drive that offers 21MB of data storage on a 3.5-inch floptical disk. The drive can also read from and write to 1.44MB Macintosh-formatted disks and 720K and 1.44MB DOS-formatted disks. It has an external termination switch and SCSI ID selector, and it ships with formatting software. The company says the drive has an access time of 80ms and a sustained data-transfer rate of 200K per second when working in the 20MB floptical mode. \$585. Procom Technology, 714/852-1000, 800/800-8600; fax 714/852-1221.

GatorLink

A multiuser device that extends an AppleTalk Ethernet network across dial-up telephone lines and provides access control in the form of zone lists, allowing administrators to select which AppleTalk zones will be visible to users. The device uses a Motorola 68302 processor, which provides three dedicated RISC engines to handle I/O duties, leaving the MC68000 free to provide AppleTalk Remote Access services. The GatorLink also supports Security Dynamics'

ACE/Server security system and does not operate as a router. \$1899. Cayman Systems, 617/494-1999; fax 617/494-9270.

Ilisi Ethernet Card

An Ethernet board for the Ilisi that uses Direct Memory Access to transfer data directly into system memory; is available in thick, thin, and 10BaseT configurations; and has two LEDs to indicate network status and link integrity. The board also has a pass-through slot for future options and can be configured with a 20MHz floating-point unit for an additional \$100. The board is based on National Semiconductor's SONIC chip set and proprietary software driver. 10baseT thin and thick \$319; 10baseT thick \$279; thin and thick \$279. TechWorks, 512/794-8533, 800/688-7466; fax 512/794-8520.

Kingfisher

A video-capture board that has composite, S-Video, RGB, and YUV inputs; captures still or video images in 8-bit color or gray-scale. The included software allows users to control brightness, con-



Kingfisher

trast, saturation, and hue; also includes gamma correction, flicker, and noise-reduction filters. \$1895. Graphics Unlimited, 1A Norwich St., Cambridge CB2 1ND, United Kingdom.

MirrorImage 309

A 300-dpi, 9-pages-per-minute laser printer that

uses a Weitek RISC processor and includes Adobe PostScript Level 2 software and 35 Adobe typefaces. The 8 1/2-by-11-inch printer has a SCSI port as well as AppleTalk, serial, and parallel ports; comes with 2MB of RAM, upgradable to 10MB. \$1699. Mirror Technologies, 612/633-4450, 800/654-5294; fax 612/633-3136.

MT30

A 4mm DAT tape drive that provides up to 8GB of storage and ships with the company's Memory-tape Manager software that provides automatic, unattended backup for an unlimited number of Macs. The software has a feature called Tape Rollover that allows a backup to automatically continue to another drive when the capacity of the first tape device is exceeded. Tape Shadowing automatically creates a second backup tape whenever a backup is performed. \$2680. Memorybank, 313/761-2783, 800/562-7593; fax 313/761-3263.

Phaser III PXi

A plain-paper color printer based on phase-change ink-jet technology that now includes Tektronix proprietary TekColor Fine-point technology, which allows the printer to print with fine detail. TekColor Previewer—software that is built into the printer's driver—has also been added and gives users the ability to preview output before it goes to the *continues*



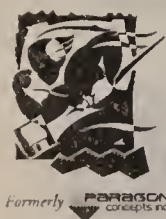
Phaser III PXi

Compare Nisus® Compact with WriteNow® 3.0 and see for yourself in black and white why less is more.

Sometimes less is more.
More word processing power for less money.
Superior features using less disk space. Exclusive PowerBook-friendly design in a compact package. Nisus Compact.
The best alternative when you only want to buy what you need.

	NISUS Compact	WriteNow 3.0
Suggested Retail Price	\$150	\$245
Toll-Free Tech Support	Yes	No
Uses Claris® XTND to Read/Write MS.® Word	Yes	Yes
POWERBOOK FEATURES:		
Battery Status & Clock Display	Yes	No
Sleep Command Within Program	Yes	No
Battery Conservation	Yes	No
Thick Cursor & Insertion Point Preference	Yes	No
EDITING FEATURES:		
Headers/Footers	Yes	Yes
Paragraph Style	Yes	Yes
Footnotes	Yes	Yes
Custom Keyboard Equivalents	Yes	No
Unlimited Undos	Yes	No
Noncontiguous Selection	Yes	No
Rectangular (Vertical) Selection	Yes	No
File Management & Retrieval System	Yes	No
Graphics Layer	Yes	No
SPELL CHECKER:		
Words	135,000	135,000
User Dictionary	Yes	Yes
Skip All	Yes	No
Replace All	Yes	No
Auto Hyphenation	Yes	No
Thesaurus Words	1.4 Million	1.4 Million
FIND/REPLACE FEATURES:		
Find All	Yes	No
Wild Cards	5	1
Font, Size, Style, Color Sensitive	Yes	No
Phonetic Find	Yes	No
OTHER FEATURES:		
Editable Clipboard	Yes	No
Electronic Bookmarks	Yes	No
Swap Paste	Yes	No
Append Copy	Yes	No
32 Bit Addressing	Yes	Yes
Virtual Memory	Yes	Yes
System 7 Compatible	Yes	Yes

"...best new PowerBook product I've seen."
Steven Bobker, MacUser 6/92



NISUS
Software Inc.

107 S. Cedros Ave
Solana Beach
CA, 92075

FREE DEMO!

Phone (619) 481-1477 ext. 73
Fax (619) 481-6154 ext. 73

© Nisus Software Inc. All referenced trademarks are property of their respective holders.

NEW PRODUCTS

printer. The printer's inks have been reformulated to adhere to a broad range of media and produce durable prints. \$9995. Tektronix, 503/682-7377, 800/835-6100; fax 503/682-2980.

PMO-650

A 650MB rewritable optical drive that incorporates the company's Optical Hard Drive mechanism, offering speeds the company says are faster than most hard drives. The drive also features an 80188 processor running at 20MHz for strategic data mapping and data queuing on reads and writes. \$3995. Pinnacle Micro, 714/727-3300, 800/553-7070; fax 714/727-1913.

PowerPortrait

A SCSI-based, 15-inch display for compact Macintoshes, PowerBooks, and Mac-compatible portable computers that has built-in QuickDraw acceleration and supports resolutions of 72 dpi, 80 dpi, and 88 dpi; the refresh rate is 97Hz. The monitor does not require a graphics board and has a built-in hardware pan mode that allows users to work on a virtual two-page desktop at up to 1024 by 1024 pixels. An optional anti-glare, antistatic coating is \$50. Platinum model with DB-25-to-DB-25 cable \$995; granite model with HDI-30-to-DB-25 cable \$1095. Sigma Designs, 510/770-0100, 800/933-9945; fax 510/770-2640.



PowerPortrait

QuadraLink DMA

A board for NuBus Macintoshes that provides four serial ports running at 57.6Kbps. The board includes AE Shadow software that enables programs that do not use



QuadraLink DMA

Apple's Communications Toolbox to recognize and use the four extra ports. Optional ShadowLAN software allows users to share any of the four ports—as well as a Mac's built-in serial ports—across an AppleTalk or EtherTalk network. \$499; with ShadowLAN software \$599. Applied Engineering, 214/241-6060, 800/554-6227; fax 214/484-1365.

RGM-1901

A 24-bit, 19-inch color monitor designed for color proofing and correction that resolves 1024 pixels horizontally by 768 vertically. It is built to maintain a white balance and color temperature of 5000 degrees Kelvin, and it has an advanced beam-feedback system for maintaining a constant black level. The monitor uses clear, unfiltered glass and SMPTE Type C color phosphors. \$6995. Sony Corporation of America, 201/930-7796, 800/222-7669; fax 201/930-7837.



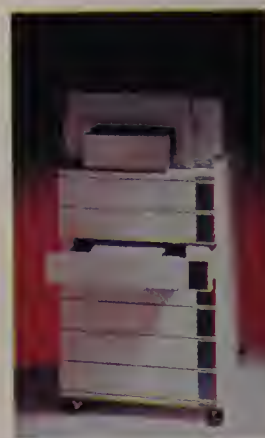
RGM-1901

SB-TMO-1000

A 1GB external 5 1/4-inch rewritable optical disk drive that uses a Maxoptix Tahiti II drive mechanism; is backwardly compatible with ANSI/ISO-standard 650MB 5 1/4-inch cartridges; and comes with partitioning, mounting, and password-protection software. MicroNet says the drive has an access time of 35ms and sustained data-transfer rates of greater than 900K per second. \$5345. MicroNet Technology, 714/837-6033; fax 714/837-1164.

TowerFeed 444

A device that can be configured with up to five paper drawers (each with a 500-sheet capacity) for use with Apple LaserWriter IIInt, IIIntX, IIIf, and IIg. A coding system inside each drawer identifies the size and type of paper in that drawer so drawers can be changed without reconfiguring printer or device. The TowerFeed's driver soft-



TowerFeed 444

ware allows users to choose a paper type from any print dialog box. \$1995 to \$3445, depending on the number of trays installed. Rutishauser, 813/254-6878, 800/676-3962; fax 813/254-7891.

UltraDrive 120MO

A 120MB, 3 1/2-inch magneto-optical drive that GCC claims has an average access time of 35ms. The drive comes with one 120MB cartridge, the company's DriveManager disk-management software, and MacTools Deluxe from Central Point Software. \$1899. Additional cartridges \$69 each; three-pack \$177. GCC Technologies, 617/890-0880, 800/422-7777; fax 617/890-0822.

VISIT Video

A desktop video-conferencing application that uses switched-56 digital and ISDN lines and lets users see real-time video images of each other on a Macintosh screen while sharing documents, graphics, and other information. The system includes software, a video circuit board, camera, and communications hardware to access public and private telephone networks. The product also supports a full range of Northern Telecom's digital PBXs. \$2900 to \$3500 depending on network configuration. Northern Telecom, 408/988-5550, 800/667-8437; fax 408/764-2659.

SOFTWARE

Bankruptcy Mac 2.0

A set of FileMaker Pro templates that generate bankruptcy forms for Chapter 7 and 13 filings. The program was designed to produce the new Official Bankruptcy

Forms and contains all forms necessary for filing with the clerk of any U.S. District Bankruptcy Court; additional practitioner forms are also included. The package automatically calculates a summary of schedules as well as computations for the debtor's current income and expenditures. 2MB min. memory. \$119. cpo law, 419/695-8480.

Battle of Britain 2

A color, simulation game that re-creates the Battle of Britain using a plotting map, tote-board system, and other information. The player tracks radar and ground observer reports, analyzes the size and potential threats of enemy forces based on incoming information, and interprets daily intercepts. The player must also cope with changing weather patterns, dwindling resources, and the Luftwaffe's seeming ability to outfox the Allied pilots at every turn. 1MB min. memory. \$54.95. Deadly Games, 212/475-2377; fax 212/475-2377.



Battle of Britain 2

Blackjack Tutor

A blackjack simulation and tutorial package that features extensive game-summary reporting in SYLK file format, card-counting drills, and many different game configurations. The program supports up to seven players and can be set up to compare each play decision against a particular blackjack strategy and also to compare wagers against a wager strategy. Animated graphics show card dealing and collecting; players can save strategy files that contain game decisions. 2MB min. memory. \$99. InSite Systems, 919/554-4736.

ClientTrac

An office- and contact-management software package that keeps a personal scheduler by day, week, or month; has a to-do list; and can create an unlimited number of project and check lists. The program puts an icon



ClientTrac

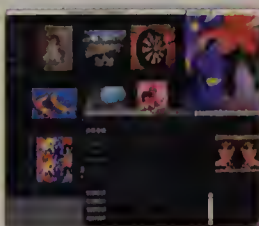
bar at the top of the screen for navigation and also serves as a word processor. For managing contacts the program can dial phone numbers, has a call-back alert, and stores a variety of client information. It also does mail merges and prints reports, phone books, and large and small mail labels. 2MB min. memory. \$135. Whiskey Hill Software, 415/851-8702.

EISToolKit

A spreadsheet-based tool for developing information systems; allows users to create custom executive information systems without programming. The systems users create feature graphical user interfaces, access to Excel and Lotus 1-2-3 spreadsheets and mainframe databases, password protection, and presentation-quality graphics. Customizable model packages enable users to track, analyze, and understand marketplace dynamics. 2MB min. memory. \$895; with Wingz \$995; run-time version for one user \$299.95; run-time version for ten users \$400. MicroStrategy, 302/427-8800; fax 302/427-8810.

ImageAccess

A relational database that provides data entry, searching, sorting, and organizational functions for images; works directly with Nikon's LS-3510AF film scanner and auto-feeder allowing unattended scanning and cataloging of up to 300 slides at a time. When an image is acquired the program records the file name, date of acquisition, location, size, dimensions, creator, and image type; other data fields can be defined by the user. File formats supported include

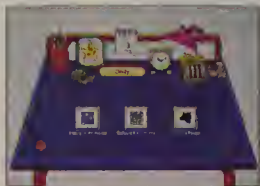


ImageAccess

TIFF, PICT, 8BIM, and JPEG; the program also creates thumbnails for each image imported, and can display a scrollable grid of thumbnails. 8MB min. memory. \$495. Nikon, 516/547-4355, 800/645-6687; fax 516/547-0305.

KidDesk

A menuing and desk accessory program that protects data on a hard drive while providing children with a personalized workspace of their own. The program hides the menu bar, gives kids easy access to applications through icons, and requires a code to exit. Users can choose from six desktop themes, including Dinosaur and Executive Desk; each desktop has several desk accessories that can be



KidDesk

accessed by clicking on icons. The accessories include a talking clock, a calculator, a calendar, and a voice-mail system that uses the built-in microphone on Macs that have one. 1MB min. memory. \$39.95. Edmark, 206/861-8200, 800/426-0856; fax 206/861-8998.

Leisure Suit Larry 5

A color, animated adventure game that stars Larry, who in this episode is the Chief VCR Rewinder for "America's Sexiest Home



Leisure Suit Larry 5

Videos," a mob-controlled television program. Players must help Larry in his quest to find a hostess for the show. A second plot line runs in conjunction with Larry's story: Patti goes undercover to expose corruption in the entertainment industry. The program also features a *continues*

Removable, Rewritable, Remarkable.

Introducing DataPak™ MO/128, the latest thing in magneto-optical storage from Mass Microsystems.

Slip 128MB of storage into your shirt pocket. Send it in a courier envelope, or secure it in your desk drawer. DataPak MO/128 stores an incredible 128MB onto a DataCart™ cartridge that's nearly as small as a floppy disk. And like all DataCart cartridges, this one includes a Mass Micro exclusive: *Our Lifetime Warranty.*



The best of both worlds. DataPak MO/128 gives you both removable drive performance and optical drive reliability.

DataPak performance is nearly twice that of earlier optical drives. And because DataPak MO/128 incorporates high-technology non-contact laser design, loss of data is virtually eliminated, keeping your precious data where you want it when you want it.

Give us a call and discover why DataPak MO/128 is the best removable storage solution for you.

 **MASS**
microsystems
1-800-522-7979

©1992 Mass Microsystems, Inc., 810 West Maude Avenue, Sunnyvale, CA 94089. Phone: 408/522-7979. Fax: 408/522-7999. Mass Microsystems and the Mass Microsystems logo are registered and Mass Micro and Hitchhiker are trademarks of Mass Microsystems, Inc. Mac and Macintosh are registered trademarks of Apple Computer, Inc.

Circle 207 on reader service card

stereo soundtrack. 2MB min. memory. \$69.95. Sierra On-Line, 209/683-4468; fax 209/683-3633.

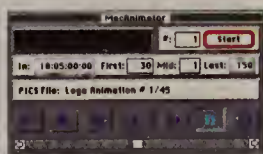
Mac Video Titler

A video character generator for video production that works with Adobe Type Manager and TrueType fonts, supports NTSC and PAL video output boards, and enables users to record titles to videotape or save them as

PICT files. Users can select fonts, sizes, styles, and colors for each individual character and can add drop shadows; titles can also be keyed over a PICT image. 5MB min. memory. \$139.95. McQ Productions, 415/348-1344, 800/659-4755; fax 415/342-0199.

MacAnimator

A video-animation controller for recording PICS



MacAnimator

animations and PICT file sequences onto videotape; requires any NTSC or PAL video output board and works with most 1-inch and all broadcast-quality 3/4-inch, MII, and Betacam recorders, as

well as professional SVHS recorders. Versions of the software exist for industrial-level recorders that don't provide RS-422 serial remote port. 5MB min. memory. \$249.95. McQ Productions, 415/348-1344, 800/659-4755; fax 415/342-0199.

MacEnvelope Professional

An envelope-labeling and addressing package de-

signed to take advantage of the United States Postal Service's automation technology to speed delivery and save postage. The program has a database that stores up to 300,000 records and saves dates, comments, flags, and carrier routes. The package also prints wide-area bar codes, pre-sort orders, carrier lines, and package and sack reports with automation totals. It has an optional CASS certified ZIP+4 lookup feature for retrieving addresses from CD ROM. 2MB min. memory. \$250. Synex, 718/499-6293, 800/447-9639; fax 718/768-3997.

memory. \$129. No Hands Software, 415/321-7340.

Nutri-Calc Plus

A diet-analysis program that lets users assess foods, recipes, and meals for nutrient content. The package includes a database of over 3500 foods, including prepared foods, fruits, vegetables, and fast foods; users can also add foods to the database. The application analyzes foods for 33 nutrients and compares the information to RDA averages and a user's dietary goals. 1MB min. memory. \$169. CAMDE, 602/926-2632.

ScreenShare

A network utility package that enables an instructor to demonstrate computer programs and techniques to students by broadcasting an image to all computer screens with the ScreenShare software installed. When the instructor takes control of the screens, the program temporarily suspends programs running on students' computers and disables students' keyboards. 1MB min. memory. \$329 per lab site. White Knight Software, 604/290-4855; fax 604/430-0144.

SoftPolish

An application that examines an individual file, a folder, or an entire volume; looks for conflicts with Apple's user-interface guidelines, finds misspelled words, and detects missing resources. The program performs over 50 tests on resources that contain visible elements of the Mac interface and several hundred tests for resource validity problems that can cause applications to be incompatible with other software. The program generates a log and includes an English spelling dictionary; nine international spelling dictionaries are available for \$49 each. 2MB min. memory. \$295. Language Systems Corp., 703/478-0181, 800/252-6479; fax 703/689-9593.

Super QuickDex

A package of three utilities for storing information and contacts, printing envelopes using the stored data, and printing a variety of address books. QuickDex II is a desk accessory that works



MacEnvelope Professional

MacParcel

A desk accessory that calculates United Parcel Service rates and zones to give users costs for shipping UPS parcels and letters in the United States and Puerto Rico. A user inputs the destination zip code, weight, and declared value for a shipment; the program then calculates the shipping zone and total cost for shipment, including C.O.D., insurance, and any user-defined handling charges. 1MB min. memory. \$39.95. Computer:applications, 919/846-1411; fax 919/846-1412.

Magnet

A utility that uses three steps to perform a variety of actions including finding files, scheduling backups, automatically filing items on the desktop, changing the views in the finder, and keeping shared files current. The user first identifies the kind of files the software should look for, then determines when to find them, and finally, decides what Magnet should do with them. The software can also reconcile files between two Macs, updating older files with more recent versions. 1MB min.

Anti-virus software that's tough on viruses, not on you.

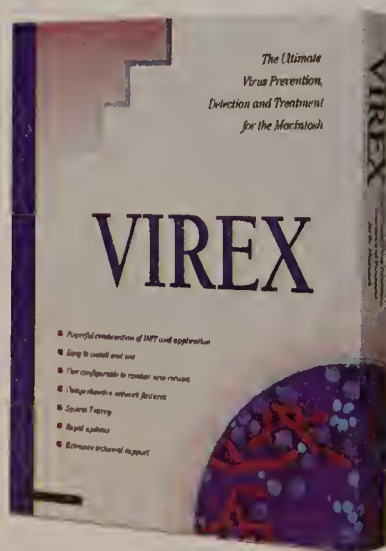
Computer virus problems within your organization can be a nightmare. New Virex[®] 4 is a network manager's dream. Its powerful network features enable Macintosh network managers to configure and update individual user machines from a single Mac. Network managers can also gather information about virus attacks within the organization. And Virex has always been the easiest anti-virus product to use. With Virex, you won't be tied up with lots of user questions about your anti-virus software.

NEW NETWORK FEATURES

USER-UPDATABLE

EASY TO USE

GREAT SERVICE & SUPPORT



Virex is available in single units and in an attractively-priced 10-PAK. See your favorite retailer to purchase Virex today or call us about our convenient site licensing program. Virex is also available for IBM-PC and compatible computers.

microcom

PO Box 51489 • Durham, NC 27717
(919) 490-1277 ext.623 FAX:490-6672
BBS: 419-1602 (8,1,N)

as a free-form database and autodialer; QuickElope is a single-envelope-addressing desk accessory with type auto-sizing, centering, and printing; PrintDex is an application that prints information from QuickDex II in multiple address book forms. 1MB min. memory. \$89.95. Casady & Greene, 408/484-9228, 800/359-4920; fax 408/484-9218.

CD ROMS

Darwin

A collection of the works of Charles Darwin that includes the complete text and illustrations from *The Voyage of the Beagle*, *Origin of Species*, and *The Descent of Man*, as well as Michael T. Ghiselin's book *Triumph of the Darwinian Method*. The text from the five-volume set *Zoology of the Voyage of the Beagle* is also included. The CD contains a bibliography of over 1000 primary and secondary references, a timeline detailing significant events in Darwin's

life, and more than 650 color and black-and-white images. \$99.95. Lightbenders, 415/621-5746, 800/432-3766; fax 415/621-5898.

PrimeTime

A collection of media clips that includes over 100MB of animated actors, background props, and sound clips for use with the company's Promotion and Addmotion II animation processors. The CD ROM also contains buttons for use in the programs and in QuickTime movies. The clips can also be used in a variety of animation and presentation packages from other vendors. 4MB min. memory. \$99.95. Motion Works, 604/685-9975; fax 604/685-6105.

Resource Library Volume I

A collection of public-domain color pictures and QuickTime movies taken from sources such as NASA and the U.S. Department of Agriculture. Subjects include animals, people, plants, space, weather, farms, and

ranches. 2MB min. memory. \$49.95. Bliss Interactive Technologies, 405/439-2247.

Total Baseball

A multimedia-based history of baseball that includes more than 2600 pages of statistics and articles dating back as far as 1871; more than 500 images of players, teams, and ballparks; and sound clips of some of the game's memorable moments. The product has over 120 years of detailed statistics, standings, and images. Includes batting, pitching, and fielding registers for major league players; the top 100 all-time, lifetime, and single-season leaders in a variety of categories; and full team rosters. 2MB min. memory. \$69.95. Creative Multimedia Corp., 503/241-4351, 800/776-9277; fax 503/452-5930.

ACCESSORIES

Macky Sac

A 5-inch neoprene-and-cotton beanbag for use as

a wrist rest to provide support to user's wrist, elbow, and upper arm. Macky Sacs have Velcro fasteners that let users connect several of the devices together. The product comes in blue, purple, pink, and black. \$6.99. WYSI Z WYG Design, 619/488-6852, 800/748-6236.



Macky Sac

Paper Partner

A paper-out sensor that works with a variety of printers—including the Apple LaserWriter II series, Hewlett-Packard LaserJet II and III series, and the Canon LBP 8II and III series. The sensor is placed in an open slot at the rear of a printer's paper tray and beeps when the printer runs out of paper. The Paper Partner is powered by an alkaline battery pack, which is only used when the device is beeping. Installa-

tion requires no modification to the printer. \$69.95. Action Laser Products, 714/491-1983, 800/289-1983; fax 714/491-0501.

BOOKS

Macintosh Programming Secrets, Second Edition

A collection of tips, techniques, and diatribes on how to program the Macintosh that is fully updated to cover System 7 and other new Mac features. The book's first section explores the underlying concepts of Mac programming and details bits of its history; the second section focuses on designing applications and includes exercises that demonstrate the capabilities of dialog boxes, QuickDraw, the mouse, windows, and other features. Written by Scott Knaster and Keith Rollin. \$29.95. Addison-Wesley Publishing Co., 617/944-3700, 800/447-2226; fax 617/942-1117.

The Macintosh Hard Disk Companion

A guide to using hard drives on a Macintosh under System 6.X or System 7 that covers a wide range of topics including start-up failures and data-recovery techniques. *The Macintosh Hard Disk Companion* is 400 pages long and contains a detailed troubleshooting guide. Written by J. Russell Roberts. \$26.95. Sybex, 510/523-8233, 800/227-2346; fax 510/523-2373. **m**

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.



Saving the best of America.

From the Atlantic to the Pacific, the Arctic to the Gulf, our land is constantly under attack from the polluters and despoilers.

That's why Sierra Club Legal Defense Fund attorneys are pursuing dozens of cases nationwide in defense of wildlife, rare habitats, the air we breathe and the water we drink.

Most of our support comes from individual contributors like you. Please help us win. Because we're saving the best of America.



Earth Share

Sierra Club Legal Defense Fund

180 Montgomery St., Suite 1400
San Francisco, CA 94104

THE WORD IS OUT

Ad makers rely on the new
Multi-Ad Creator™ 3.5
to create exciting
ad layouts
with ease.

Call
1-800-447-1950
EXT-355

APPLE®
MACINTOSH®
ONLY

MULTI-AD

Creator™

Multi-Ad Creator is a product of MULTI-AD SERVICES, INC.™

1720 West Detweiller Drive • Peoria, IL 61615-1695

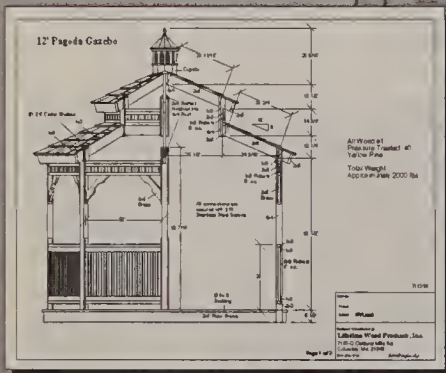
Circle 126 on reader service card

Turn Your Mac Into a Staff of CAD Experts..

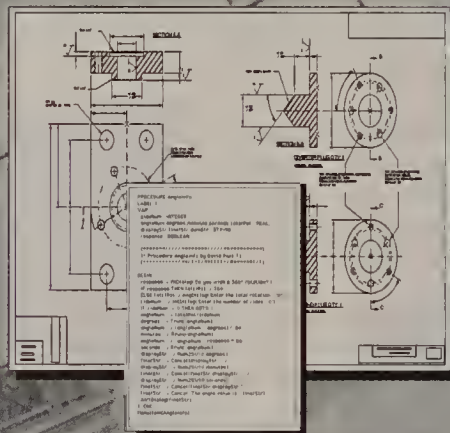
NOW WITH
Claris Cad™ Translator

Introducing MINICAD+ 4

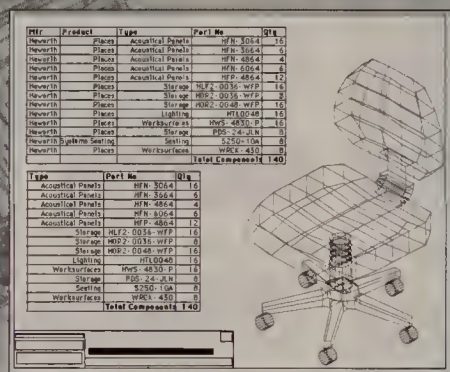
4 Major Areas of CAD Power



2D CAD : With MiniCad+, the original award-winning CAD program, you've drafted the price/performance leader in Macintosh CAD. Hundreds of advanced, easy-to-use tools make superior-quality drawing a snap.



3D CAD : Create stunning, high-precision models directly in true 3D or auto-create from your 2D drawings. A tightly linked 2D/3D interface makes MiniCad+ a modeller of choice. Export 3D files for high-end rendering in StrataVision™.



Programmable CAD : Why be limited by parametrics? Over 300 powerful graphics and database routines extend Mini-Cad+ for the advanced user.

Database CAD : Let MiniCad+ become your specialized cost estimator by using it to price out projects, create area tables, track manufacturers, create a bill of materials etc., without leaving the drawing area.

1989
MacWorld
Award



1990
MacUser
Award



New Features in MiniCad+ 4 : Interactive 2D/3D, intelligent wall, floor and roof tools, walkthroughs, flyovers. Display objects in multiple views simultaneously. 3D SmartCursor™ auto-creation of 3D models from 2D (hot-linked!), tolerancing, definable dash types. Full front plane clipping, "cut" tool, cavalier and cabinet projections, automatic section generation and hybrid symbols. New mode/message bar plus other enhancements make this the easiest-to-use MiniCad+ ever.

©1991 Graphsoft Inc.™

Graphsoft

3370 Court Ave.
Ellicott City Md. 21043
410-461-9488
fax 410-461-9345

\$795
Demo \$19
30 Day
Money Back
Guarantee

Questions and Tips from Macworld Readers

BY LON POOLE

IN THE APRIL ISSUE A READER inquired whether she'd be better off taking her U.S. system overseas (specifically, Germany) or buying a replacement system there. My response included a table of electrical power requirements collected from various Apple documents. John O'Toole of Benton Harbor, Michigan, spotted an error in the table, and I found a couple more. The Mac IIsi works with any voltage from 100 to 240 (not just 120 volts); The AppleCD SC requires 100V to 120V power (the AppleCD SC Plus works with 100V to 240V); and the StyleWriter is not recommended for use with 50Hz power.

D. Smith of Aachen, Germany, was surprised my response didn't address the reader's "fiscal and mental *Gesundheit*." Smith says compared with the price and service benefits of the super-competitive U.S. market, the cost of European Macs and the support that accompanies them are appalling. In Germany, the price you pay for most hardware is between 50 and 100 percent higher than the list price in the United States (and you rarely pay full list price in the U.S.). A 10 to 15 percent import duty and a 15 percent value-added tax explain part of the higher prices. You can forget trying to negotiate a better deal; dealers' reactions range from surprise to offense. And the concepts of service, products in stock, trade-ins, courtesy, and free delivery (indeed, free anything) haven't yet been translated into the European Apple desktop lexicon. Software costs are similarly outrageous—try \$210 to upgrade from Word 4 to Word 5, or \$300 to go from More 3.0 to 3.1! Fortunately, most well-known U.S. mail-order companies ship to Europe, and savings are usually significant even after freight and duty are paid. Smith's advice for Macintosh fanatics moving overseas is to take your Mac with you.

Control Panels, DAs, and Memory

Q Under System 7, do control panels and desk accessories use RAM when they're not open?

Mitchell Rose
Los Angeles, California

A DAs use memory only when you open them. Under System 7, each open DA gets 20K of memory. If a DA needs more memory than that, it increases the system software's memory size between 10K and 200K (depending on its individual memory needs). You can observe this in System 7 by checking the system software size with the Finder's About This Macintosh command before and after opening a DA. When you open DAs under System 6 with MultiFinder, they get all their memory by increasing the system software size; without MultiFinder they steal memory from the open application program.

A control panel uses memory when it is not open if it includes a system extension (also known as an INIT or start-up document). The Mac loads the system extension portion of the control panel into memory during start-up, increasing the system software size by 10K to 300K per control panel. Many control panels display icons during start-up if they contain built-in system extensions, but not all do. Two of the standard control panels contain system extensions and increase the system software's memory size—Easy Access (about 12K) and Memory when it's used on a PowerBook (about 38K). To find out which of your control panels contain system extensions and how much some of them increase the system software size, you can use the Profiler module of Now Utilities from Now Software (503/274-2800). Profiler reports the increase in system software size only if you have installed the StartUp Manager module of Now Utilities. You can use Now's StartUp Manager or the free program Extensions Manager 1.6 by Ricardo Batista (available from user groups and online services) to determine which control panels load. You can also prevent a control panel from loading by dragging its icon to the desktop or to a folder other than the System Folder, Extensions folder, or Control Panels folder.

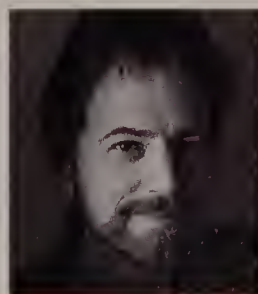
To temporarily suspend loading of all extensions and block opening of items in the Startup Items folder, press the shift key while starting up or restarting the Mac. If you wait to press shift until you see the Finder's menu, then all extensions will load, but the items in the Startup Items folder will not be opened.

Control panels do not get their own slices of memory when you open them. When you open any System 7 control panel, it uses part of the Finder's memory. With System 6, you open one control panel device at a time inside the Control Panel desk accessory.

TrueType and LaserWriter Incompatibility

Q I can't print TrueType fonts on my original LaserWriter. Apparently TrueType fonts are converted to PostScript Type 1 format before being downloaded to an original LaserWriter, but that model has insufficient memory to image those downloaded fonts. Do you know if upgrading to a LaserWriter Plus will let me print TrueType fonts? My Apple dealer can't tell me if a Plus has more RAM or just more ROM to supply additional fonts. Is the RAM in a LaserWriter Plus expandable?

H. Edwin Simmers
Bellingham, Washington



Using TrueType
on old Laser-
Writers, scoring
big in Lunatic
Fringe, making
custom icons,
and more

A Both the original LaserWriter and the LaserWriter Plus came with 1.5MB of RAM. The Plus's 1MB ROM has more PostScript fonts and better memory management than the LaserWriter's 0.5MB ROM. The original LaserWriter's memory-management methods (in the printer's ROM) can't make space in the printer's RAM during a print job to allow automatic downloading of TrueType fonts (actually the PostScript derivatives created by the Laser-

continues

Writer driver). My best information is that neither model uses SIMM chips, so increasing RAM wouldn't be practical.

Apple claims you can use the LaserWriter Utility program that comes with System 7 to manually download a TrueType font to an original LaserWriter, enabling you to print documents containing that font. Because the LaserWriter Utility program downloads the font to the printer before the print job begins, the LaserWriter's limited memory management doesn't have to cope with a change during the print job. However, you will probably be able to manually download only one TrueType font at a time.

Like the original LaserWriter, the Plus can't print TrueType fonts directly, but its improved memory management can make space in RAM for a font automatically downloaded during a print job. So the Plus should be able to work with the automatically downloaded PostScript Type 1 fonts that the LaserWriter driver software on the Mac derives automatically from the TrueType font.

Performance is slow, particularly when converting and downloading multiple TrueType fonts for one document.

Don't get swept away by TrueType hype. If you've got an original Laser-

Writer or LaserWriter Plus, you're better off sticking with PostScript fonts. You can replace TrueType fonts by converting them to PostScript format with the FontMonger program from Ares Software (415/578-9090), and you can use Adobe Type Manager (ATM) to see smooth PostScript fonts at any size on screen. You can get a copy of ATM and four Adobe Garamond fonts for \$7.50 by calling 800/521-1976, ext. 4400. Outside the United States and Canada you can get an International English version of ATM for \$30 by calling 303/799-4000, ext. 4600.

Upgrade or Not

Q. Three years ago I bought a Mac Plus with a 20MB hard drive and am considering upgrading it from 1MB to 4MB of RAM so I can use software that requires large amounts of memory. With so many new Mac models coming out, is the Plus worth upgrading? I don't want to invest in something useless.

*Andrew McCurdy
Randolph A.F.B., Texas*

A. A Mac Plus with 4MB of RAM is no speed demon but is far from useless. In fact you can accomplish quite a lot with a 2.5MB Plus and one of the

newer integrated software products such as ClarisWorks or Symantec's GreatWorks. A 2.5MB or 4MB Mac Plus is also adequate for word processing, accounting, telecommunications, basic drawing, uncomplicated spreadsheet calculation, and modest data management tasks. With 4MB you can keep at least two application programs open concurrently using System 7 or System 6 with MultiFinder. With 2.5MB you can count on having only one application program and the Finder open at the same time. Use System 7 if you need one of its special capabilities such as file sharing; otherwise stick with System 6 for its faster Finder, whose extra speed is especially noticeable on a Plus.

You should move up to a Classic II, LC II, or faster model when you start thinking about doing page layout, extensive graphics, slide presentations, complicated spreadsheets, involved database management, or other demanding work. To figure out where you are on the continuum between basic and complex graphics, spreadsheet, or database work—and consequently whether or not to get a faster Macintosh—take stock of how much time you use your Mac and how much of that time you spend waiting for it. The more you use it and the more

NEW!

The \$99 wonder.



OFFICE MANAGER.

An elegantly simple program with a powerful address file, built-in letter processor, to-do list, and job tracking file. Prints letters, labels, address books, fax cover sheets. It's quick. It's easy. It's ready to use right out of the box.

CERTIFIED FUN. We guarantee it.

Try Office Manager for 30-days. If you're not dazzled, we'll refund your purchase price.

TALK TO US ABOUT OFFICE MANAGER
AND RESERVE YOUR FREE DEMO.

1-800-639-2720

White Crow Software, Inc.
19 Marble Avenue
Burlington, Vermont 05401

White Crow™

Circle 92 on reader service card

MACINTOSH SECURITY PRODUCTS

COMPLETE LINE OF PROVEN AND EASY TO INSTALL
SECURITY PRODUCTS FOR MACINTOSH COMPUTERS.

PREVENT
COMPUTER THEFT!



ACCESS SECURITY



MacKabli™ Security System

This system allows you to secure all your computer components: CPU, monitor, keyboard, printer. *Internal component security:* Kablit fasteners secure the rear panel of CPU protecting internal boards and hard drives. Fasteners available for all applications. List price \$39.95.

Disk Drive Lock™

Prevent anyone from copying your data. Protect your data from harmful viruses. Prevent unauthorized use of your drive. Installs easily and quickly. Models available for all Macintosh models (except Mac Plus). List price \$24.95.

Order your free catalog of these and many other security products. Purchase orders accepted. Quantity pricing available. Shipping not included. MC/VISA accepted. Dealer Inquiries Invited.

Secure-It, Inc.

18 Maple Court
East Longmeadow, MA 01028

1-800-451-7592

Circle 239 on reader service card.

you wait, the more you would benefit from a faster Mac.

When upgrading your software, you will need not only more RAM but also more storage space. You can buy a larger external hard drive now, use it with your Mac Plus, and later use it with a faster Mac model. When you get the drive, make sure it's formatted properly for a Mac Plus. The interleave ratio, which determines how the drive staggers blocks of saved data, should be 3:1 for best performance on a Plus. If you move the drive to a faster Mac, you must back up the drive and format it on the new Mac. For best performance on anything besides a Plus or an SE, set the interleave ratio to 1:1.

Self-Service

Q. I have been a Macintosh user through my college years and am now a teacher and my school's computer coordinator. The school has decided to put in a new Mac lab—a prospect that really excites me. I would like to become a licensed Mac technician so I can maintain, upgrade, repair, and service Macs. Is there a manual or some software that could get me started?

Daron VanderHeiden
Austin, Minnesota

A. You can probably install RAM, internal hard drives, and internal expansion boards without any formal training. Most of these products come with complete installation instructions (RAM and internal hard drives from Apple being notable exceptions). One author, Larry Pina, has written several books about repairing and servicing Macs. *The Dead Mac Scrolls* (Peachpit Press, 1992; 510/548-4393 or 800/283-9444) helps you diagnose common problems in Macs up to the II and SE/30, ImageWriters, and LaserWriters up to the IINTX. The book suggests general repair procedures but includes no detailed instructions. Pina's other books tell you how to fix the problems. *Macintosh Repair and Upgrade Secrets* (Howard W. Sams, 1990; 317/573-2500 or 800/545-5914) covers Macs through the SE. *Macintosh II Repair and Upgrade Secrets* (Brady Books, 1991; 317/573-2500 or 800/428-5331) covers all Mac II models and Apple's 12-inch monochrome and 13-inch color monitors.

You can become authorized to service your own equipment through Apple's Dealer Sponsored Servicing Owner (DSSO) program. An Apple dealer sponsors your enrollment in mandatory Apple-certified training classes, sells you service

modules and parts, and answers your technical-service questions. For more information, ask your dealer for a copy of the DSSO Product Sheet, which the dealer can get from his or her local Apple customer service manager. If you own or manage more than 100 Macs, you can apply for the DSSO program at a local Apple sales office (call 800/767-2275 for the location of the office nearest you).

Custom Folder Icons

TIP If you have too many look-alike folders cluttering your desktop and you use System 7, you can liven them up by superimposing a relevant application icon (see "Look Lively"). First copy a folder icon from its info window, which you view with the Finder's Get Info command, and paste it into a paint program. Then open the folder that contains the application whose icon you want to use, set the window view to By Small Icon, and take a screen snapshot (press ⌘-shift-3). Open the screen snapshot file (named Picture 1, Picture 2, or something similar on your start-up disk) with the paint program or with TeachText, copy the small application icon from the snapshot, and paste it over the previously pasted

continues

HANDS OFF

Simply place NISCAN Spectra™ over your image to scan. It's as small as a hand scanner but gives you the resolution of a flatbed. And the scanner head does the work, leaving your hands free. Spectra doesn't waste valuable space on your work surface, either.

24-Bit Color Scanner

Spectra captures over 16 million colors in a single pass in resolutions of 25 to 400 dpi. Now you can scan a 4" X 6" area with the same color fidelity as your 24-bit color printer. And Spectra requires no interface card; it comes with software ready to plug



into your Macintosh or PC.

Scan Transparencies or Prints

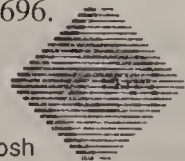
Spectra comes ready to scan any reflective art. And now you can scan transparencies as well with the addition of a simple lightbox, saving a lot of time and money.

Under \$1000

At this price, 24-bit color has never been so reasonable. And a quality scanner has never been so convenient and easy to use. To get your hands on one, call (214) 242-9696.

NISCAN SPECTRA

For the PC or Macintosh

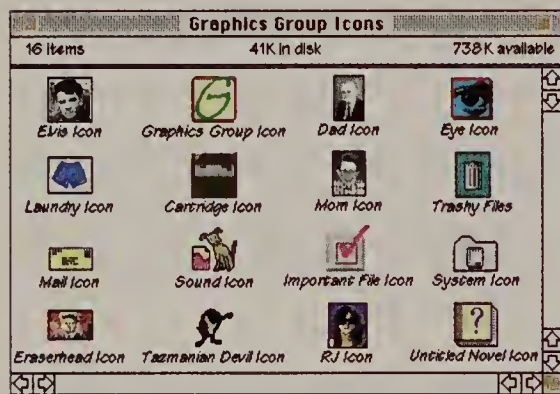


NISCA Corporation, Tokyo (03) 3374-7881 • NISCA Incorporated, Dallas (214) 242-9696

Copyright © 1992 NISCA Incorporated. NISCAN and NISCAN Spectra are trademarks of NISCA Incorporated. All product names and trademarks are the property of their respective owners.



Look Lively If you use System 7, you can replace plain folder icons with livelier composite icons. Copy a small application icon from a screen shot, paste it onto a plain folder icon in a color paint program, copy the composite, and paste it into the folder's info window.



Icon Store System 7 users can store hundreds of icons on a floppy for later use as custom icons. Howard Wright of Grand Rapids, Michigan, makes aliases of files with icons he wants to save and copies the aliases to a floppy named Custom Icons. Whenever he wants to customize a file, he copies the icon from the alias's info window and pastes it into the file's info window.

folder icon. Finally, copy the composite icon from the paint program, paste it into the custom folder's info window, and close the info window.

*Alex Johnson
Cincinnati, Ohio*

The custom icons obscure any subsequent changes you make to the folder's color from the Finder's Labels menu, or to the folder's file-sharing status using the Finder's Sharing command.—L.P.

SIMM Compatibility

TIP I read in the January issue about some SIMM incompatibilities [1MB SIMMs that have only two chips instead of eight chips may not work on a Mac Plus, an SE, a Classic, a Mac II, or a IIx; and some third-party 2MB SIMMs do not work on a Mac LC or IIsi—L.P.]. I recently discovered another memory problem, much to my chagrin. The Mac II and IIx are not compatible with standard 4MB SIMMs, but require special SIMMs with

PAL (programmable array logic) chips. In addition, the Mac II cannot be upgraded to more than 20MB with 4MB SIMMs because the bank-A SIMM sockets work only with 1MB SIMMs.

*Maurizio Maggiore
Milan, Italy*

Macintosh Technical Note 176 explains that the original Mac II ROM limits the four SIMMs in bank A to a maximum of 1MB each. You can put four 4MB SIMMs or four 16MB SIMMs in bank B for a total of 20MB or 68MB. You may also be able to install 2MB SIMMs in bank A; the booklet *Macintosh Memory Guide* (distributed free by Connectix, 415/571-5100 or 800/950-5880), says you can. You can work around the bank-A limitation by installing the \$449 Mac II SuperDrive upgrade kit (part M6051/C), which includes a set of Mac IIx ROMs along with an internal SuperDrive and the SWIM chip (Super Woz Integrated Machine, named after Steve Wozniak, who invented the circuitry used for all Apple floppy disks except 1.4MB disks). This upgrade raises the Mac II's RAM limit to 128MB, the same as the limit for the SE/30, IIx, IIcx, IIsi, and IIfx. To use more than 8MB of installed RAM on any Mac, you must either use System 7 and turn on 32-bit addressing in the Memory control panel or use Connectix's Optima software with System 6.0.7. To use System 7's 32-bit addressing on a Mac SE/30, II, IIx, or IIcx, you must install Connectix's Mode32 software (available free from Apple dealers or by calling 800/776-2333). Whether you use Mode32 with System 7 or Optima with System 6, you must also install a 68881 PMMU (Paged Memory Management Unit) chip to use more than 8MB of RAM on a Mac II.

Tech Note 176 also explains that the special PAL chips prevent the Mac II and IIx from unwittingly activating a test mode built into the RAM chips used on 4MB SIMMs. These chips came into being after Apple designed the Mac II and IIx; the previous generation of memory chips, which are used in 1MB SIMMs, do not have the problem-ridden test mode. Although only the II and IIx require the 4MB SIMMs with PALs, those SIMMs are compatible with the SE/30, Classic II, LC, IIsi, IIcx, IIsi, and Quadras (but not the IIfx, which has unique SIMMs).

Tech Notes are available from some user groups and online information services. You can also order a complete set of notes and a year's update subscription on disk for \$65 or on paper for \$100 from APDA (408/562-3910 or 800/282-2732, 800/637-0029 in Canada).—L.P.

Lunatic Fringe Mania

TIP Just when I thought it was safe to reboot—I spent most of last year at the Betty Ford Center trying to extradite little Lode Runner men from my nightmares—I happened upon my roommate firing at little purple bubbles on his new Mac. Five months, many one-upped high scores (don't ask, but it's Level 67), and innumerable games later, I have decided to come clean on my tricks and tactics for that sneaky little option in Berke-

ley Systems' After Dark screen-saver program, Lunatic Fringe by Ben Haller.

1. The faster you kill, the faster you advance levels. It takes four levels to get to the first real threat, the puffer, and two more to reach the deep threat, the slicer, at level 6. This may take 15 minutes. So kill fast, making use of the special weapons (they reappear somewhere in the grid as soon as you use them up). An option is to set the starting level as high as you can, for example, to level 10.

2. The hammerhead is easier to kill after it has released its mace and, as is true for each alien except the slicer, after it has bumped into an asteroid. Aim for the nose of the alien's ship. If you're a pufferphobe, circle it and shoot repeatedly at its backside.

3. You can use the turbo thrust to kill. If you are near death but still have a turbo thrust, aim your ship at the pursuing alien and hit the turbo thrust button. This works most satisfyingly with the slicer. You are invulnerable while you are thrusting, and can bump the alien to death. Although turbo-thrust-killing (like killing with the power shield) brings only half the normal number of points, it's almost always a more attractive option than dying.

4. With the triple gun, get as close to the alien as possible and blast it to smithereens in one shot.

5. If your turn jets are damaged and you are spinning wildly through space, hold down both the Turn Left and Turn Right buttons. This stops you from rotating and allows you to pilot yourself, albeit in fits and starts, in a specific direction.

6. Long sweeping passes through the entire grid often turn up hiding places of special weapons, turbo thrusts, power shields, and so forth.

7. In the high levels, avoid the hammerhead if you haven't any special weapons. Be content with killing sludgers and slicers instead.

*Alex Pugsley
Toronto, Canada*

We pay from \$25 to \$100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the addresses listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses. **m**

LON POOLE answers readers' questions and selects their tips for this monthly column. His two most recent books are *Amazing Mac Facts* (Microsoft Press, 1991), a collection of the best published tips; and *Macworld Guide to System 7* (IDG Books Worldwide, 1991).

CREATIVE VISION IN A CHANGING WORLD

MACWORLD Expo Canada 1992

September 15-17, 1992 at the Metro Toronto Convention Centre

When you look out over the exhibit floor at MACWORLD Expo, it's like looking through a kaleidoscope. Just a slight turn to the left or right, and you get an entirely new and fantastic view. With over 200 exhibitors, double the number from last year, MACWORLD Expo/Canada 1992 promises you more Macintosh excitement than ever before.

In addition to the exhibition, MACWORLD Expo/Canada also offers a complete Conference Program. Guided by a distinguished faculty, the Conference Program provides insights that are simply not available anywhere else. And if you're a committed DOS user, MACWORLD Expo/Canada will demonstrate the unique advantages offered by the Macintosh. You'll learn about MAC/DOS connectivity and how to take best advantage of both systems.

Preregistration Savings

Preregistration savings are available NOW: you can save \$10 on Exhibits-only admission (\$10 now vs. \$20 cash only at the door), or \$15 on all Conferences and Exhibits (\$75 now vs. \$90 cash only at the door). For discount registration information, please complete and mail the coupon found below. Then mark your calendar for September 15-17, and get ready to see the Macintosh at its absolute best!

**MACWORLD
EXPOSITION**
CANADA '92



Send completed coupon to: MACWORLD Expo/Canada, Brukar International Ltd., Suite 212, 385 The West Mall, Etobicoke, Ontario M9C 1L7, Canada; or FAX us at 416-620-1076. Or, if you prefer, call us toll free at 800-945-3313.

☐ Yes, send me discount preregistration information about attending MACWORLD Expo/Canada 1992.

☐ Yes, send me information about securing exhibit space at MACWORLD Expo/Canada 1992.

Name

Title

Company

Address

City/Province/Postal Code

Telephone



A company of firsts.
Not only was NEC the first
to introduce the fastest-
spinning CD-ROM readers,
we also introduced the
first monitor color
control system and
the first active-
matrix color
notebook.





The fastest-spinning readers ever. The InterSect™ CDR-74 and 84, only from NEC.

Now they not only have the ability to access large amounts of information quicker and easier

while maintaining the standard 150 kb/sec rate for audio tracks.

In other words, NEC's InterSect™ CDR-74 and 84 with MultiSpin™ are the speed champions of CD-ROM.

What's more, our CD-ROM

Looks like someone just discovered CD-ROM with MultiSpin.™

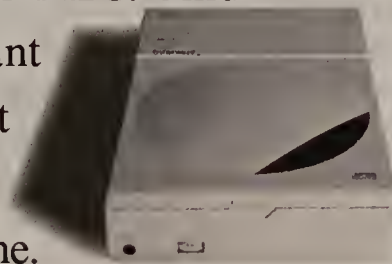
than ever before, but they provide you with endless Multimedia possibilities as well.


In fact, our MultiSpin technology can transfer data at a rate of 300 kb/sec. That's double the speed of any other CD-ROM reader. And, our readers can play back video with no pauses or lapses in motion.

But what happens to audio? Do human voices sound more like beings from another planet? Does music sound like a record being played at the wrong speed? Absolutely not. The amazing thing about MultiSpin technology is its ability to transfer data at twice the speed,

readers cover a range of price and performance needs. Choose from our external CDR-74 or internal CDR-84, with double dust doors and socketed firmware features. Or, if portability interests you, choose our CDR-37. All meet MPC Marketing Council guidelines for Multimedia computing and are fully QuickTime™ compatible.

So next time you hear the words CD-ROM, think MultiSpin.™ And remember: it's hot, it's fast, it's only from NEC. And you don't want to be the last on your block to get one.



Because  is the way you want to go.

NEC

Circle 180 on reader service card



Half of work is concentration,

To help bring your best ideas to life, Philips introduces brilliantly designed tools that provide the kind of performance you'd expect from a leader in innovation.

Brilliant Performance

Philips offers a full line of state-of-the-art products, most with multi-frequency capability, digital image control, and low emissions circuitry. Display resolutions run up to 1600x1280. And most models offer Philips' exclusive FastRefresh™ capability, which redraws the on-screen image up to 160 times per second* to reduce fatigue caused by image flicker. This level of display performance is for demanding professional applications like CAD/ CAM, advanced graphics, and document preparation.

Multi Compatibility

The Philips line is the perfect match for Intel based and Macintosh computers, as well as most workstations. Thanks to our advanced digital control autoscans technology, these monitors adapt to a wide range of high-resolution graphic controller cards supporting scan rates as high as 82kHz.

the other half is brilliant support.

The integrated front-panel LCD display provides information on product operation and sets a new standard for ease-of-use.

Complete Line of Full-Featured Monitors

Since one size never really fits all, Philips technology is available in 14", 15", 17", 20" and 21" screen sizes, with a model that's right for virtually every application.

Low Emission

Consistent with Philips' leadership position, our new monitors are equipped with VLF/ELF emission circuitry that meets or beats tough Swedish MPR-2 guidelines, and are built to perform for the long term, with 50,000 hour MTBF design reliability. Give your work the support it deserves - brilliant support from Philips.

* Actual refresh rate may be limited by video controller card or software.

Another First From Philips



PHILIPS

Font-Customizing Techniques

BY JIM HEID

THE MAC'S ABILITY TO SET TYPE in a variety of fonts, sizes, and styles has always been the cornerstone of its personality. The Mac's typographic features have improved dramatically in recent years, as *outline* fonts have become the dominant font technology in the Macintosh world. In an outline font, characters are described by mathematical equations; by processing these equations, the Mac can create characters of virtually any size—as if characters were created using rubber bands that can be stretched and resized.

The other major approach to describing fonts—the *bitmap* approach—isn't nearly as efficient or flexible. In a bitmap, or *fixed-size*, font, characters are described by an arrangement of bits. A separate arrangement is needed for each size; most bitmap fonts include descriptions for the common type sizes: 10-, 12-, 14-, 18-, and 24-point. (A *point* is a printer's unit of measurement; there are 72 points in an inch.) If you specify a point size for which no arrangement exists, the Mac *scales* an existing size to fit, resulting in misshapen, chunky-looking characters.

Instead of restricting you to specific sizes, outline fonts enable you to format text in any size—29-point, 17.5-point, 589-point. This makes it easy to fit headlines into a particular width, and it simplifies *copyfitting*—choosing the point size that enables a certain amount of text to fit in a certain amount of space.

Two outline font technologies are prevalent in the Macintosh world today: PostScript fonts are the veterans (and by far the most popular), and TrueType fonts are relative newcomers. PostScript printers such as Apple's LaserWriter IIx and IIg contain a selection of PostScript font outlines; you can supplement these *resident* fonts with *downloadable* fonts, which live on the Mac's hard drive and are transferred to the printer's memory during a print job. The most common and preferable format for PostScript downloadable fonts is *Type 1*; *Type 3* is a less common format that generally delivers inferior results on laser printers. If you use the Adobe Type Manager (ATM) utility, you can print Type 1 PostScript fonts on non-PostScript printers such as Apple's

StyleWriter or Personal LaserWriter LS.

Because of their flexibility, outline fonts are naturals for special typographic effects. Stretching a font more vertically than horizontally creates a skinnier, *condensed* version of the original typeface. Stretching it more horizontally than vertically gets a wider, *expanded* font. Attach an outline font to a curved line to create wavy-looking text, or stretch it to fit an irregular shape. You can even alter the characters themselves to create logos, special symbols, and fractions.

Numerous programs are available that let you perform these and many other font-customizing jobs. Altsys's Fontographer and Letraset's FontStudio let you alter fonts and create new ones from scratch. Ares Software's FontMonger, Type Solutions' Incubator, Design Science's ParaFont, and Altsys's Metamorphosis Professional are best suited to modifying existing fonts—converting them from one outline format to another, expanding or condensing them, or creating fractions.

Type-effects programs such as Letraset's LetraStudio and Brøderbund Software's TypeStyler let you twist, stretch, squeeze, mold, mirror, and otherwise modify type. Both excel at *display type*—fancy headlines, product labels, logos. They let you do with a mouse what used to require hours of labor over a layout table or in a darkroom.

This month, I show how to perform several font-customizing jobs using these and other programs. You need to know how to install fonts in your system; instructions are in your Mac manual.

Expand and Condense

EXPANDING OR CONDENSING, or *horizontally scaling*, a typeface can give it a new, distinctive personality. A condensed font looks more delicate and allows more text to fit on a page; an expanded font has a weightier look (see "Expanding and Condensing").

The Aldus PageMaker and QuarkXPress publishing programs let you expand or condense text formatted in existing fonts; drawing programs

such as Aldus FreeHand and Adobe Illustrator do too. But wouldn't it be more convenient to have fonts that are expanded or condensed to begin with? That way, you could use them in programs that don't have horizontal-scaling commands, such as word processors. You can scale fonts in advanced programs such as Fontographer, but it is often easier in the basic (and more economical) font-customizing programs.

How to: ParaFont Choose New from the File menu, and then choose the font you want to scale from the Base Font pop-up menu. Select the Bold and Italic check boxes if you want to scale those styles, too. Choose FontAttributes from the File menu and type a name for the new PostScript font—for example, TimesCondensed or TimesFat. (A PostScript font name can't have a space in it.) From the Edit menu choose Select All and then Transform. Type the desired scaling percentage in the Horizontal Scale text box. Finally, use the File menu's Make Screen Fonts and Make PostScript Font commands to generate the bitmap and PostScript outline fonts to install in your system.

How to: Incubator Choose the TrueType font you want to modify from the Font menu. (Incubator works only with TrueType fonts.) Use the Width scroll bar to condense or expand the font, watching Incubator's sample-text display and preview window until you get the desired results. Finally, create the new font: click on Create, type a name for the font, click on OK, and then on Save. Install the resulting font file.

Because horizontal scaling distorts the proportions of a typeface, it compromises the original type design. Avoid scaling by more than 25 percent or so in just one direction unless you're after a particularly dramatic or gaudy effect.

Adobe's new Multiple Master font technology enables you to horizontally scale fonts without compromising the original type design. Besides being able to expand or condense a font, you can also

continues



*Mold, shape,
and refine the
Mac's cast of
characters with
today's top font
programs*

create any font weight, from extra light to extra bold. For details on this breakthrough font technology, see "Understanding Multiple Masters," *Macworld*, September 1992.

Let's Get Fractional

IF I HAD A DIME FOR EACH TIME I SAW a phony fraction such as 1/2 in an otherwise good-looking publication, I'd be rich enough to run for president. You can create your own fractions the hard way by reducing the type size of the numbers and then, if your word processor or publishing program allows, shifting the numerator up by a few points. Some fonts contain ready-made fractions; best of all are the *expert sets* some font vendors sell, whose *true-cut* fractions match a specific typeface, with the small numerals tweaked for better legibility.

You can also customize an existing font to create your own fractions—even oddball ones like $\frac{15}{128}$. It's easiest in FontMonger and ParaFont.

How to: FontMonger Use the Open command to open the font for which you want to create a fraction. When the keyboard display appears, select the key to which you'll assign the fraction. (To use an option-key or shift-option-key sequence, click the appropriate modifier key[s] in the keyboard display.) After selecting a spot for the fledgling fraction, choose Alter Character from the Keyboard menu. When the Alter Character dialog box opens, select the kind of fraction you want and then type the numerator and denominator in the appropriate text boxes (see "Making Fractions"). Click on OK, and then save the new, customized font using a different name to avoid replacing the original.

How to: ParaFont From the Base Font pop-up menu, choose the font for which you want to create fractions. Choose Fractions Only from the Key Layout pop-up menu, and then click on OK. ParaFont creates a font containing common fractions. You can double-click on a fraction in the keyboard display to specify your own numerator and denominator. Use the File menu's Make Screen Fonts and Make PostScript Font commands to generate the bitmap and PostScript outline fonts you'll install.

When creating a fraction, ParaFont extends numerals slightly to make them more legible—a nice touch. The results still don't quite compare to the true-cut fractions of expert font sets, but they're close. ParaFont's other customizing options use similar techniques; for example, the program can simulate *old-style figures*—numerals with ascenders and descenders, usually available only in expert

Times Roman. Thin and elegant. Stretch out.

Expanding and Condensing Expanding or condensing a font can give it a new personality. The original Times Roman (top); condensed 20 percent (middle); expanded 30 percent (bottom).

sets—by condensing certain characters and moving them up or down.

Turning Text into Pictures

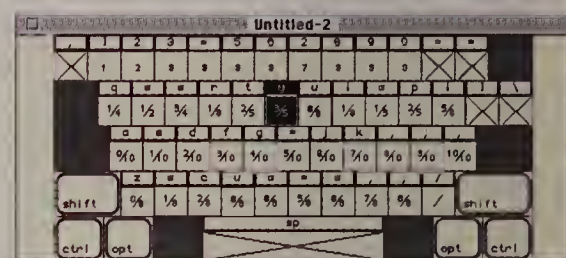
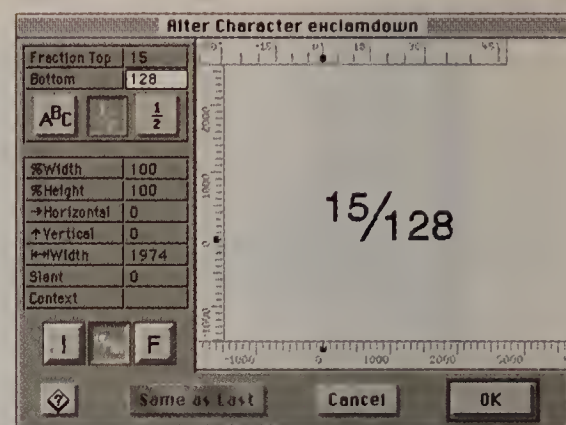
MANY COMPANY LOGOS CONSIST OF text that has been stylized, reshaped, shaded, or otherwise modified. Using Altsys's Metamorphosis Professional (Meta Pro, for short), you can convert a passage of text into an object-oriented PICT graphic you can paste into a graphics program and polish as you please.

How to: Metamorphosis Professional In Meta Pro's main window, click on the Convert Text button and choose the PICT to Clipboard option from the Format pop-up menu and the Type Your Own option from the Text pop-up menu. Choose the desired font, style, and size from their respective menus (a large size such as 100-point gives the best results—you can scale it down later). Type the text you want to convert in the text box and then click on Convert (see "Prose to Picture"). After the conversion is complete, switch to a graphics program and paste. If you paste into Claris MacDraw II or MacDraw Pro, you can reshape an individual character by selecting it and then choosing Reshape from the Edit menu. Keep in mind you won't be able to edit or reformat the text once it's a graphic. If changes are required, you'll have to return to Meta Pro and start over.

Meta Pro can also save converted text in a PICT or encapsulated PostScript (EPS) file that you can open using an object-oriented drawing program or import into a publishing program. Meta Pro can also convert fonts themselves from one format to another. If you have Type 3 PostScript fonts, for example, you can convert them to Type 1 format for use with Adobe Type Manager. Meta Pro can even convert fonts for or from an IBM PC or Next computer. If you have a Mac and a PC, you can convert Mac fonts into ones usable by Microsoft Windows.

Turning Pictures into Text

ANOTHER CUSTOMIZING TASK INVOLVES adding graphics, such as a scanned image



Making Fractions FontMonger and ParaFont make it easy to create fractions. Type the numerator and denominator in FontMonger's Fraction Top and Bottom boxes (top). The window's title indicates that the upside-down exclamation mark character (!) is being modified. Choosing ParaFont's Fractions Only keyboard layout creates a new font based on the existing font but containing only common fractions (bottom).

or an image from a clip art collection, to an existing font.

You might start by scanning an original—your signature or company logo, perhaps—and then saving the resulting image. Scan a large original if possible (if you're scanning your signature, write big); you'll get more detail in the resulting font. Import the scan into Fontographer or FontStudio and use the *autotrace* feature to trace the image. If you've worked with PostScript illustration programs such as FreeHand or Illustrator, you might prefer to trace the image by hand. In either case, the result is an outline character of the art you scanned.

How to: FontMonger First, put the scanned image on the Mac's Clipboard: using a graphics program or your scanner software, select the image and choose Copy from the Edit menu. Then start or switch to Fontographer and open the font you want to modify. Select the character position for the new character and double-click on it to open the character-editing window. To remove the character already in that position, choose Select All and then Clear from the Edit menu. Choose Paste from the Edit menu—the image appears in gray. Choose Trace Background from the Path menu and click on OK. Fine-tune the resulting outline if desired. Use the File menu's Generate Fonts command to make the font you'll install in your system.

How to: FontStudio FontStudio does not accept scans from the Clipboard; you need to save an image in TIFF, PICT, or

MacPaint format and then open the image in FontStudio as a *template*. Use the File menu's Unpack Suitcase command to open the font you want to modify. Double-click on the appropriate bitmap or outline-font icon in the Family window, and then double-click on the character you want to replace. To remove the character already in that position, choose Select All and then Clear from the Edit menu. Now choose Open Template from the Character menu and double-click on the name of the previously saved original image. Select the autotrace tool and then click within the character-editing window. Fine-tune the resulting outline if you like, then generate the font.

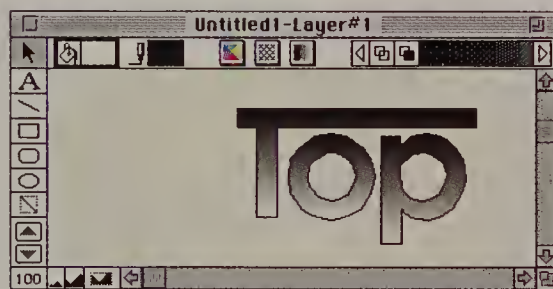
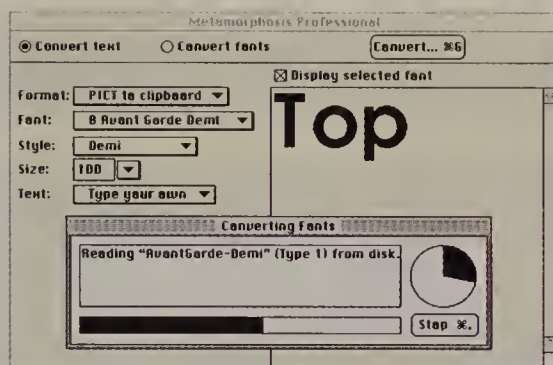
This scan-and-trace process is how font developers work: a designer hand-draws large masters for each character, scans them, and then traces them. You can apply these techniques yourself to create an entirely new font. Create a font of your own hand-printed letters (great for architects; not recommended for physicians). Or make a font from a sample in an old type-specimen book—many books containing old display type and a variety of ornamental *dingbats* are available from Dover Books. To get good results, you need to do a great deal of fine-tuning and print a ream or two of test output to check spacing in all sizes and character combinations. When done, you'll have a new appreciation for the skill and patience of a professional type designer.

Type on Display

THE FONT-CUSTOMIZING PROGRAMS I have covered so far let you create and modify fonts that you then install in your system to use with other programs. Letraset's LetraStudio and Broderbund's TypeStyler are designed to let you create special typographic effects using fonts already in your system. (Both programs also provide their own proprietary outline fonts.) The result is typically a PICT or EPS file that you import into a publishing or illustration program.

With either program, start by typing text and then formatting it in the desired font. Next, you might fine-tune the character spacing; instead of requiring you to use awkward $\&$ -key sequences to adjust spacing (as do publishing programs), both programs let you simply drag characters left or right—a more efficient and direct technique. After you tweak the spacing, you might draw a shape and resize the type to fit within it (see "Styling Type"). Nothing illustrates the flexibility of outline fonts like watching characters recast themselves to fit a shape you draw.

Both TypeStyler and LetraStudio work with PostScript and TrueType fonts



Prose to Picture Metamorphosis Pro can convert typed text into a PICT graphic that you can modify. Converting the text (top); the PICT image pasted into MacDraw Pro, where the T was reshaped and a gradient fill applied (bottom).

and also include a few display typefaces. If you work with display type frequently, investigate Letraset's Fontek library of over 100 display typefaces. Each Fontek package includes both TrueType and Type 1 PostScript versions of the first-rate display type that Letraset has been selling for years.

A simpler effects program is PostCraft International's Effects Specialist, which lets you apply 120 special effects to text you type. Effects Specialist doesn't let you fit type to irregular shapes or manually kern by clicking and dragging characters. But it does provide more special effects than TypeStyler and LetraStudio do, and you can modify those effects in a dizzying number of ways.

For those who think big, there's Broderbund's BannerMania. This fun program lets you create, yes, banners—choose one of the 50 built-in designs, type your text in any of 19 built-in fonts (or use any Type 1 PostScript font), apply one of the 34 built-in special type effects and 134 built-in color schemes, print, and then assemble the resulting pages. You can also customize designs, type effects, and color schemes. It's a sign maker's playground.

Font Futures

THERE ARE ENOUGH OPTIONS OUT there to keep a font customizer busy for years, but there are even more on the horizon. Apple has announced enhancements to the Mac's system software that will simplify the creation of three-dimensional fonts and give TrueType technology features similar to those of Adobe's Multiple Master fonts.

If you want to create stunning three-dimensional type, investigate Pixar's Typistry, which should be shipping by the



Styling Type To create display type with TypeStyler, specify the text and the desired font, effect, and shape the text will fit into (top). The resulting effect appears at bottom.

time you read this. Typistry lets you create 3-D text from existing fonts. After typing some text, you can apply a variety of surfaces—from wood grain to marble to chrome—to it as well as simulate various lighting effects. You can also animate the text and create QuickTime movies of the results (see last month's column for an introduction to QuickTime).

Note that there are some legal issues behind font customizing. Specifically, you can't legally modify a copyrighted, commercial font (or use it to create fractions) and then distribute the resulting font or post it on an online information service—even if you change the font's name. Doing so is as much a form of software piracy as copying a word processor for a friend.

You should note that some font-customizing tasks—for example, fitting text to a shape, stretching and condensing a font, applying special PostScript effects and gradients—lengthen printing times, especially to a PostScript-based image-setter. If you're creating a document laden with effects, prepare to wait—and to pay more if you use a service bureau that charges by the hour.

If your patience and budget don't restrain you from going overboard, let your sense of good taste do so. Don't go crazy with glitzy effects. Good font customizers work like jazz musicians—they improvise and customize, but they also preserve the essence of the original. **m**

See *Where to Buy* for contact information.

Contributing editor JIM HEID looks at a different aspect of Mac fundamentals each month. His latest books are *Macworld Guide to Microsoft Word 5* (1992) and *Macworld Complete Mac Handbook* (1991), both published by IDG Books Worldwide.

SUBSCRIBE NOW

Macworld Interactive



Macworld Interactive™ CD ROMs

Macworld Interactive™ is the interactive, multi-media version of Macworld Magazine. Each CD ROM issue contains articles from Macworld with QuickTime™ movies, multiple languages, voice/sound, and interactive navigation of the CD.

SUBSCRIBE NOW

Macworld Interactive

Please send me _____ copies of Macworld Interactive at \$29.95 each.

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

o Visa o MC # _____ Exp. Date _____

Signature _____

☐

Macworld Interactive
(Volume One, one issue/ CD only) \$29.95*

☐

Macworld Interactive One Year Subscription
(Volume One, five issues/CDs) \$129.95

Make check or money order payable to:

Sumeria Inc.

P.O. Box 2030, Shingle Springs, CA 95682

Phone orders: 1-800-848-6645

Fax orders: 916-677-3919

*All orders payable in U.S. Dollars. Additional shipping cost is \$2.50 for the first CD and .50 cents for each additional CD. Residents of CA add applicable sales tax. Foreign orders, U.S. currency only.

BY LON POOLE

Tips to Power Up Your Presentations

People use everything from HyperCard to MacDraw for creating presentations on a Mac, but Aldus Persuasion has been one of the most popular presentation tools since it first appeared. It's a mature, stable product and is available directly from Aldus (206/628-2320, 800/685-3540; fax 206/343-3360). The most notable improvements in its latest revision, version 2.1, include System 7 capabilities such as publish and subscribe and the ability to play QuickTime movies. Some of the tips that

follow come from Tim Davenport in Aldus technical support by way of Jill Miller in Aldus public relations. Ravi Khalsa, who runs the video service bureau Khalsa Productions in Phoenix, provided most of the information about printing presentations to videotape.

Reshaping Free-Form Graphics

Few humans can devote the long hours of study and practice required to master drawing free-form graphic objects

correctly with a mouse the first time. Persuasion 2.1 offers a crutch that earlier versions lack—the editing of free-form shapes. Select a free-form shape and choose Reshape Poly from the Draw menu. A handle appears at each vertex of the shape, and you can drag a handle or a line to change the shape. To add a handle, click anywhere on a line. To delete a handle, drag it on top of another handle. To finish editing the shape, click somewhere away from it in the window.

Chart Spacing

Persuasion has no commands for adjusting the spacing of bars in a bar chart or columns in a column chart, but you can spread out bars or columns (see "Spread Out"). Just insert rows or columns in the data sheet as though you were inserting additional categories between the existing categories. Do not leave the values of the new categories blank, or Persuasion will plot the blanks as zero values. Instead, type a blank space in each empty cell of the new categories. Click the Toggle box to reselect all the chart's cells, and then click the Replot button to have Persuasion interleave blank bars or columns among the non-blank bars or columns.

If your chart includes a legend, Persuasion adds a key for each new blank category. To remove bogus keys from the legend, ungroup the chart,

select and delete the extra keys, adjust the position of the remaining legend parts, and regroup the chart. Do this only as a final step. If you later must replot the chart, you'll have to remove the extra keys again.

Embossing Text and Graphics

You can create the effect of raised or embossed text and graphics by forsaking Persuasion's Shadow command and adding a highlight and a shadow of your own (see "Raised Text"). Working at full size, add the highlight by duplicating the original, changing its color to a lighter shade of the original's color, dragging it to a position 1 pixel above and to the left of the original, and sending it to the back. Then add the shadow by duplicating the original, changing its color to a darker shade of the original color, dragging it to a position 1 pixel below and to the right of the original, and sending it to the back. For text larger than 30-point and large graphic objects, you may prefer the look of a shadow offset 2 points below and to the right of the original. The embossing effect is most convincing if the original object is a color similar to that of its background, the highlight is two or three steps lighter in Persuasion's color grid, and the shadow is two or three steps darker. If the original

Spread Out

Neptune Aquagear:Work area					
Plot		Replot		Show	
No target chart chosen for replot.					
	1	2	3	4	5
1			Projected		Current
2	TOTAL		0.14		0.07
3	North America		0.17		0.11
4	Europe		0.14		0.04
5	Australia		0.13		0.07
6	Pacific Rim		0.08		0.03
7					



By inserting blank columns in the data sheet (top), you can spread out the bars in a bar chart (bottom) or the columns in a column chart (not shown).

nal color is light, you can make the highlight white. If the original color is dark, you can make the shadow black.

Selecting Overlapping Objects

Avoid insanity when you're selecting an object that lies behind another object, such as the highlight or shadow of an object you embossed according to the previous tip, by holding down the option key and clicking through the stack of objects. Each time you option-click, you select the next object back. To move a buried object, option-click till you select the object immediately in front of the object you want to move and then hold down the option key, press the mouse button, and drag away. Click once without pressing the option key if you want to select the frontmost object.

Merging Presentations

Sometimes you want to tailor a presentation for a new audience by merging parts of several finished presentations. You can select slides in the slide sorter of one presentation, cut or copy them, and paste them into the slide sorter of another presentation. You can also copy and paste single or multiple slides between the outlines of different presentations, but working in the slide sorters is easier. When you paste slides, Persuasion maintains all outline and data-sheet links. To select multiple slides, you either drag a selection rectangle (a marquee) around them or press the shift key while clicking each one in turn.

Don't Plot Zero

A line chart, area chart, scatter chart, or high-low chart normally shows all the values in the range of cells you have selected on the data sheet. If you have missing data or want a discontinuous plot, enter a space or dash in the cell of each point you want Persuasion to skip when it plots the

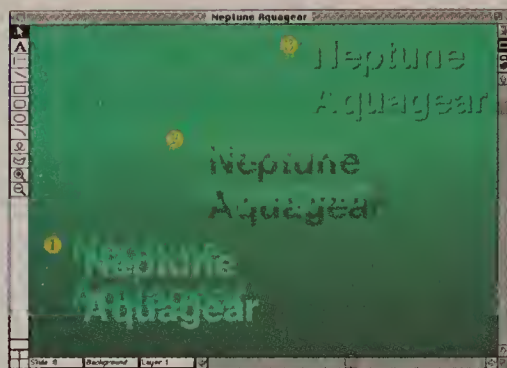


chart. If you leave a cell empty, Persuasion plots it as a zero. In a line chart, for example, the line would zig down to zero and zag back up to the next data value.

Widening a Text Block

As you type, type, type, you realize you need to widen the text block. Don't disrupt the flow of your typing by switching to the pointer tool to resize the text block. Instead hold down the ⌘ key and drag the right or left edge of the text block with the text tool.

Wrong PostScript Fonts

During the printing process, Persuasion scans the presentation and prepares a list of fonts it includes so the printer driver software can make sure the printer or film recorder contains the fonts. Persuasion does not look for fonts inside EPS (encapsulated PostScript) graphics placed in slides by the Import or the Subscribe To commands, and the printer or film recorder substitutes a standard font, often Courier, for unlisted fonts it finds in EPS graphics. You can work around this limitation by manually downloading the fonts with Apple's LaserWriter Utility (which comes with System 7) or with Adobe's Font Downloader program (which comes with Adobe fonts). You can also get Persuasion to include them on its list so they are automatically downloaded during printing. Simply type some invisible text on the master slide, including one character for each font used in the imported EPS graphics. (To make text invisible, set it to the color of the slide background.)

Raised Text Adding a highlight and a shadow to an object gives it an embossed or raised look. The highlight is a few shades lighter than the original, and the shadow is a few shades darker. Both are duplicates of the original object and are diagonally offset in back of it.

Printing to Video

Slides, overhead transparencies, and projection monitors are not the only presentation media available. You can also record your presentation on videotape or even use Persuasion to make titles for a video production. You can't simply plug a video recorder or television into the Mac because the Mac's video signal isn't compatible with television equipment. You need an encoder like the \$395 TV Encoder from Computer Video (617/937-0888; fax 617/937-0893) to transform the Mac's video signal into a standard NTSC composite or S-video television signal. The TV Encoder is compatible with video boards from RasterOps, SuperMac, and others, but works particularly well with the Apple 8•24 and 8•24GC video boards or with the built-in video of a Quadra. The Apple video sources, when set for 256 colors in the Monitors control panel, automatically filter out the flickering you would otherwise see in thin lines when they appear on television. To filter flicker with other video sources, you must use an expensive scan converter instead of an encoder. You cannot correct flicker with the tools in Persuasion.

When creating presentations for video, set the slide size to be the size of the screen. To do this, you choose the Page Setup command and dismiss the first dialog box by clicking OK. In the second dialog box, named Presentation Set-up, set the Slide Shape option to Screen and click OK. In the third dialog box, Adjust Graphics, set the options according to how you want Persuasion to adjust the

slides in your presentation, and click OK. This creates a slide that fills the screen when you view the presentation with the Slide Show command.

Televisions overscan their picture tubes, enlarging the picture so it does not all fit on the screen. You must fit your presentation inside the NTSC safe zone, or objects near the edge may be cut off when they appear on television. To be safe, keep everything about ¾ inch from the edges of the Mac's screen.

Bigger is better; that's the general design rule for television. Make text 24-point or larger and use sans serif fonts. Small text and the detail in serifs become blurry on television. The same goes for thin lines in graphics, so use lines at least 2 pixels thick and avoid detailed line and fill patterns.

Saturated colors, especially red and orange, *bloom* on television—bleed beyond their boundaries. Use subdued colors, preferably from the top three rows of Persuasion's color grid, and keep the contrast low between adjacent colors.

Put enough black slides at the beginning and end of your presentation to provide 10 seconds of leader and trailer. You can use this time to operate the video recorder. To record a presentation, start it with the Slide Show command (set the Slide Advance option to Automatic and the slide-timing options to durations suitable for your presentation). When the black leader appears on screen, press the record button on the video recorder. Stop the video recorder during the black leader at the end of your presentation.

Contributing Your Tips

Do you have a technique or shortcut not mentioned here? Share it with *Macworld* readers by sending it to *Quick Tips*, *Macworld*, 501 Second St., San Francisco, CA 94107. [m](mailto:tips@macworld.com)

Contributing editor LON POOLE answers readers' questions and selects their tips for the *Quick Tips* column each month.

Release Your Imagination

Experience the Power of Multimedia Computing at the 6th Annual CD-ROM Expo



September 30 - October 2, 1992 • World Trade Center • Boston

Release yourself from the limits of conventional computing. Discover new ways of managing information with unprecedented ease and efficiency. From indexing and retrieval to developing and publishing, to the multimedia mix of text, image and sound, CD-ROM gives you the power and the ability to reach new markets, and do more in less time.

Find out how at CD-ROM Expo.

You'll see the advantages of optical technology, whatever the environment you work in. The versatility and ease of CD-ROM allows you to cruise through complicated tasks of researching, editing and presenting information. You have complete control over publishing, engineering, manufacturing, and many other mission critical applications.

At CD-ROM Expo you can see how optical technology can work for you by visiting these exhibitors: **3M Optical Recording, Dataware, EDUCORP, Fulcrum, Hitachi, IBM, Meridian Data, NEC Technologies, Northern Telecom, Pioneer, Sony, Toshiba**, and many more. You'll experience first hand the wide range of applications available, as well as the hardware, software, development systems, and multimedia

platforms that makes them possible. Plus, our outstanding conference program offers unique insights on the latest technologies and markets, with experts in the field sharing their knowledge and experience. Find out more about CD-ROM Expo by returning the coupon below. And make your plans now to experience the technology that's as unlimited as your imagination.



YES, I want to release my imagination at CD-ROM Expo, September 30-October 2, 1992, World Trade Center, Boston.

- ☐ Please send me information on attending.
- ☐ Please send me a complete conference brochure.
- ☐ Please send me details about reserving booth space.

NAME

TITLE

COMPANY

ADDRESS

CITY

STATE ZIP

PHONE

Fax to 617-361-9074 or mail to CD-ROM Expo, c/o Mitch Hall Associates, 260 Milton St., Dedham, MA 02026. **MAC/10**

MACWORLD

MPC
WORLD

ETA

In association with *Macworld* magazine, *MPC World* and Emerging Technology Applications

HOW TO



TRY

Would you buy shoes without trying them on? Probably not. Yet how often do you buy a Macintosh® product without some hands-on experience? Most of the time, right? Pretty risky proposition with hundreds, maybe thousands, of dollars at stake.

Now there is a better way...



BEFORE YOU BUY

Simply go to your local Macintosh Reseller and ask them to run *The Resource*!

THE MACWORLD RESOURCE

is an Interactive Showroom that provides information, demonstrations and free trial software—all of the tools you need to make an intelligent purchase decision.

BRING FLOPPIES—TAKE FREE SOFTWARE

The Resource employs the latest multimedia technology to deliver the kind of information you need when you need it most, in the retail showroom. You can print literature, view interactive demos, compare product features and take home free trial software. So don't leave home without a few blank floppies.

IN-DEPTH INFORMATION ON HOT PRODUCTS

You'll find the hottest products from top Macintosh software and hardware companies.



...PLUS A DIRECTORY OF THOUSANDS

The Resource features a database of thousands of the latest Macintosh products. You can easily locate listings and automatically generate a printed request for more information.

SEE YOUR RESOURCEFUL RESELLER!

Run The Resource!

Dear Reseller:

If you have the *Macworld Resource CD™*, please install *The Showroom* for your customers. If you have not received *The Resource*, please call or write:

Macworld CD Ventures Inc.
501 Second Street • San Francisco, CA 94107
415/974-7474

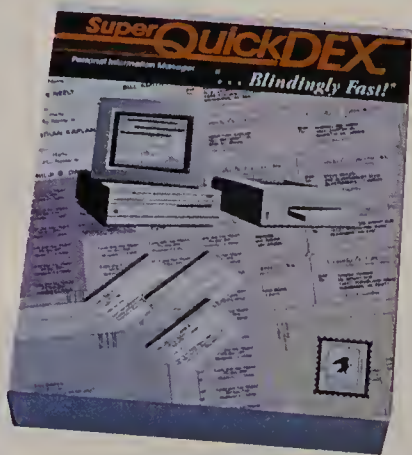
Clip this coupon and take it to your favorite reseller. If they don't have the Macworld Resource CD, we will get it there.



The object of our software is to give you more time...



Fluent Laser Fonts™ Library 2
120 PostScript™ and TrueType™ fonts for the Mac or PC in an unbelievable variety of styles. The best font library on the market.
Retail: \$179.95



Super QuickDEX™
A 4-utility package with freeform database and printing utilities that will organize you once and for all!
Retail: \$89.95



Crash Barrier™
Finally, a possible means of recovery from the dreaded operating system error. Features include assistance with system error prevention & recovery and work auto-saving.
Retail: \$79.95



A.M.E.™ version 2.1
The most comprehensive Mac security package on the market is now System 7 compatible. Many new features!
Retail: \$279.00

so you can play our games.



Mission: THUNDERBOLT™
Intriguing new role-playing, adventure game. Search through alien-infested underground corridors for the deadly anti-matter bomb. A true thinker's challenge.
Retail: \$59.95



Glider™ 4.0
Just try to keep the paper airplane flying through the eerie mansion without being blitzed by the weirdest set of obstacles ever!
Retail: \$49.95



Sky Shadow™
Only your audacious, white knuckled bombing raids over enemy territory can save your home planet. Wild and crazy! Great sounds!
Retail: \$49.95



Crystal Quest™ with CritterEditor™
Collect all the crystals and avoid all the nasties! Change over 1000 game parts with the Editor. A fast-moving, adrenaline-boiling game!
Retail: \$49.95



Aqua Blooper Piper™
No bloopers allowed! Fit the pipe pieces together just right before the basement floods! One wet and wild game!
Retail: \$49.95

The Casady & Greene strategy: To satisfy you, our customers, with simply the most innovative, useful, and well-priced software to make your work easier and save you lots of time. Isn't that why you bought a Macintosh in the first place? Then - Zap - we introduce you to our "Can't-put-the-darn-mouse-down", award-winning Mac games to fill in all your new spare time. Pretty clever, huh? Join our software users' family. We can do great things for you!

CASADY & GREENE

Call your favorite dealer or contact us to order or receive more information.
22734 Portola Drive • Salinas, California 93908-1119 • Technical Support: (408) 484-9228, Fax: (408) 484-9218

800-359-4920

Circle 67 on reader service card

Where to Buy

Products Featured in This Issue

EDITED BY SUZANNE COURTEAU

THIS LISTING PROVIDES COMPANIES AND PHONE NUMBERS FOR PRODUCTS MENTIONED IN THIS ISSUE.

ALL ABOUT SCANNERS

Abaton, a subsidiary of Everex Systems
510/683-2226, 800/444-5321; fax 510/683-2151.

Adobe Systems
415/961-4400, 800/833-6687; fax 415/961-3769.

Advanced Vision Research
408/434-1115, 800/544-6243; fax 480/434-0968.

Aldus Consumer Division
206/628-5739.

Animas, Corp.
510/656-1117; fax 510/656-4409.

Apple Computer
408/996-1010.

Artix Technologies
408/956-0144, 800/643-0666; fax 408/956-1552.

Barneyscan Corp.
510/562-2480, 800/933-0330; fax 510/562-6451.

Caere Corp.
408/395-7000, 800/535-7226.

Canon USA
516/488-6700, 800/848-4123; fax 516/488-3623.

The Complete PC
408/434-0145, 800/634-5558; fax 408/434-1048.

Computer Friends
503/626-2291, 800/547-3303; fax 503/643-5379.

Epson America
800/922-8911.

Flamingo Bay
404/564-9924; fax 404/979-8240.

Fujitsu Computer Products of America
800/626-4686.

Hardware That Fits
409/760-2400, 800/364-9335; fax 409/539-4141.

Hewlett-Packard
800/752-0900.

Howtek
603/882-5200, 800/444-6983; fax 603/880-3843.

HSD Microcomputer USA

415/964-1400, 800/828-5522; fax 415/964-1538.

La Cie, a Quantum Company
503/520-9000, 800/999-0143; fax 503/520-9100.

Letraset USA
201/845-6100, 800/343-8973; fax 201/845-4708.

Light Source
415/461-8000, 800/231-7226; fax 415/461-8011.

Logitech
510/795-8500, 800/231-7717; fax 510/792-8901.

Marstek
714/833-7740, 800/366-4620; fax 714/833-7813.

MicroFrontier
515/270-8109, 800/388-8109; fax 515/278-6828.

Microtek
213/321-2121, 800/654-4160; fax 213/538-1193.

Mirror Technologies
612/633-4450, 800/654-5294; fax 612/633-3136.

New Dest Corp.
408/436-2700, 800/822-8884; fax 408/436-2750.

Nikon
516/547-4355, 800/526-4566; fax 516/547-0305.

Nisca Corp.
214/242-9696, 800/245-7226; fax 214/245-0942.

Our Business Machines
818/337-9614, 800/433-1435; fax 818/960-1766.

Panasonic Communications & Systems
201/348-7000.

Pentax Technologies
303/460-1600; fax 303/460-1628.

Prime Option
310/618-0274, 800/282-9877; fax 310/618-1982.

Relax Technology
510/471-6112; fax 510/471-6267.

Savitar
415/243-3030; fax 415/243-3080.

Sharp Electronics Corp.
201/529-9500, 800/237-4277; fax 201/529-9637.

Thunderware
510/254-6581, 800/628-0693; fax 510/254-3047.

Truvel, division of Vidar Systems Corp.
703/742-9500; fax 703/471-1165.

Umax Technologies
408/982-0771, 800/562-0311; fax 408/982-0776.

XRS

310/214-1900; fax 310/214-1474.

CD ROM DRIVES: INTO THE MAINSTREAM

Apple Computer
408/996-1010.

CD Technology
408/752-8500; fax 408/752-8501.

DynaTek Automation Systems
416/636-3000; fax 416/636-3011.

Hitachi Home Electronics
404/279-5649.

Liberty Systems
408/983-1127; fax 408/243-2885.

MacProducts USA
512/472-8881, 800/622-3475; fax 512/499-0888.

Mirror Technologies
612/633-4450, 800/654-5294; fax 612/633-3136.

NEC Technologies
708/860-9500, 800/632-4636.

Optical Access International
617/937-3910, 800/433-5133; fax 617/937-3950.

Panasonic Communications & Systems
201/348-7000.

PLI
510/657-2211, 800/288-8754.

Procom Technology
714/549-9449, 800/800-8600; fax 714/549-0527.

Relax Technology
510/471-6112; fax 510/471-6267.

Sony Corp. of America
408/432-1600, 800/222-7669.

Texel America
408/736-1378.

Todd Enterprises
718/343-1040 or 718/343-9180.

DESKTOP CRITIC

Ars Nova Software
206/889-0927, 800/445-4866; fax 206/889-0359.

Dr. T's Music Software
617/455-1454, 800/989-continues

This is where teachers buy their technology. Shouldn't you?



Call today for your free catalogs!



Your #1 Source for Educational Software & Technology

USA/Canada
800-624-2926

In Illinois
708-888-8300

EDUCATIONAL RESOURCES, 1550 EXECUTIVE DRIVE, ELGIN, IL 60123

Circle 28 on reader service card

**Nº 1 IN
VALUE**

MACCENTER™

The Center Of The Macintosh Universe™

**Nº 1 IN
SERVICE**

ACCELERATORS: 68040 & 68030

radius™

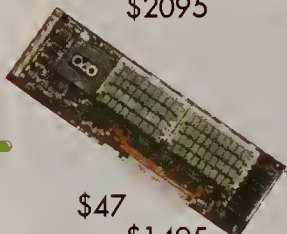
Rocket 25
Rocket 25i
Rocket 33



\$1629
\$1239
\$2095

IMPULSE
TECHNOLOGY

Animals
Performance/040/iop 25 MHz
Performance/040/iop 33 MHz

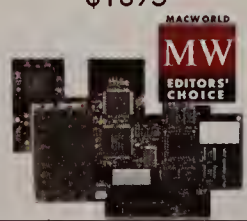


\$47
\$1495
\$1895

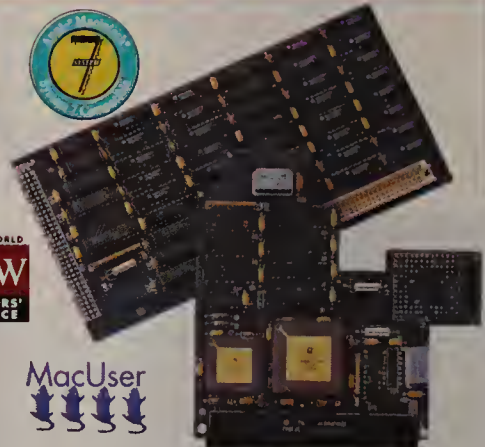
NEWLIFE™

MacUser
★★★★2

Classic Accelerator
SE 16 MHz 68030 \$489
SE 25 MHz 68030 \$399
SE 25 MHz 68030 \$679



DAYSTAR
DIGITAL



SALE!

"...this is one Mac purchase you'll never regret."
MacWEEK 9/17/91



All PowerCards & PowerCaches are brand new, in original DayStar boxes. All sales final.

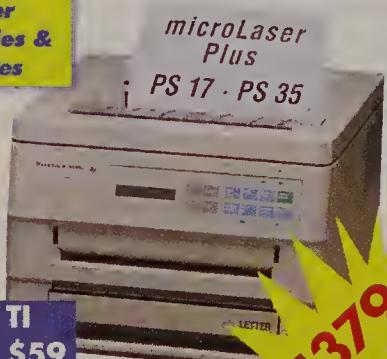
PowerCards

40 MHz PowerCard 030 (IICx only) **\$599**
50 MHz PowerCard 030 (II, IICx, IICx) **\$899**

PowerCaches (Non-Universal & Universal)

40 MHz PowerCache 030 **\$599/\$799**
50 MHz PowerCache 030 **\$899/\$1099**

**We Stock All
Printer
Accessories &
Supplies**



MacUser
★★★★

**2 Meg NEC
Upgrade \$159**

NEC

Silentwriter2 Model 95
Second Paper Drawer
Fax Upgrade

\$1379

**TEXAS
INSTRUMENTS**

MacUser
★★★★

microLaser Plus PS17 \$1225
microLaser Plus PS35 \$1379
microLaser Turbo \$1595

SupraFAXModem™

The SupraFAXModem V.32bis is the only 14,400 bps modem with 14,400 bps send and receive fax!



SupraFAXModem V.32bis w/sft/cbl \$379
SupraFAXModem V.32 wo/sft/cbl \$329



**ALL PRINTER PRICES INCLUDE
FREE TONER**

SYQUEST DRIVES

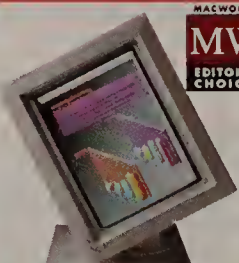
**Eagle™
SyQuest**



Eagle 44 \$399
Eagle 88 \$499
44 Meg Cartridge \$65
88 Meg Cartridge \$109

All Eagle SyQuest drives come with a metal case, a universal power supply, 12 megs of shareware, SCSI & power cables and a two year warranty. Ask about our Five Year Warranty.

MONITORS



radius

24XP \$499
Pivot, Color \$1275
Pivot, Mono \$695
PowerView \$499
Precision Color Display/20 \$2755

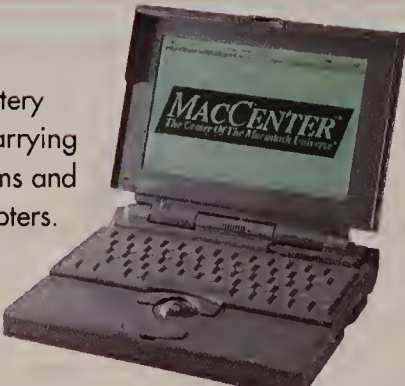
NEC

MultiSync 3FGx \$639
MultiSync 4FG \$759
MacFG 8X Color Card \$799
MacFC 24X Color Card \$1599

**FREE CD-ROM with
FGs! Call for details!**

MACINTOSH SYSTEMS

We Stock
PowerBook
Batteries, Battery
Chargers, Carrying
Case, Modems and
Display Adapters.



PowerBook 170 4.40 \$3599
PowerBook 170 8.80 \$Call!
Quadra 700 \$3899
Quadra 950 \$Call!

We also stock IICi, IIsi, and all Quadras.

SIMMs

4 Meg 80ns **\$92**
1 Meg 80ns **\$30**
2 Meg 80ns **\$58**
6 Meg PowerBook Memory **\$259**

**AIRBORNE
EXPRESS**



HOURS: 8:00 am - 8:00 pm CDT M-F
10:00 am - 4:00 pm CDT Saturday
Sunday: Call, you may get lucky.

MACCENTER™

4930 South Congress, Suite 303 • Austin, Texas 78745

800-950-0950
FAX 512-476-3726
International Orders 512-476-7466

International



United Kingdom 0800-89-5074
Germany 0130-81-4748

France 05-90-1430
Mexico 95-800-292-7029

WE CARRY MAC SYSTEMS! CALL 800-950-3726 FOR A FREE CATALOG!

MacCenter 1992
Catalog valid 8/28/92 - 9/28/92

6434; fax 617/455-1460.
EduActive
 603/668-4788, 800/
 824-4788.
Imaja
 510/526-4621.
MacBeat
 505/473-4929, 800/622-
 2328; fax 505/473-4647.
MiBAC Music
Software
 507/645-5851; fax
 507/645-9291.
New Sound Music
 313/355-3643.
Opcode Systems
 415/856-3333; fax
 415/856-3332.
Software Toolworks
 415/883-3000, 800/
 234-3088.

GETTING STARTED

Adobe Systems
 415/961-4400, 800/833-
 6687; fax 415/961-3769.
Altsys Corp.
 214/680-2060; fax
 214/680-0537.
Ares Software Corp.
 415/578-9090; fax
 415/378-8999.
Brøderbund Software
 415/382-4400, 800/521-
 6263; fax 415/382-4419.
Design Science
 310/433-0685, 800/827-
 0685; fax 310/433-6969.
Letraset USA
 201/845-6100, 800/343-
 8973; fax 201/845-4708.
Postcraft International
 805/257-1797; fax
 805/257-1759.
Type Solutions
 603/382-6400; fax
 603/382-4839.

QUICKTIME—
YOUR FIRST TIME

Adobe Systems
 415/961-4400, 800/833-
 6687; fax 415/961-3769.
Computer Friends
 503/626-2291, 800/547-
 3303; fax 503/643-5379.
Digidesign
 415/688-0600, 800/333-
 2137; fax 415/327-0777.
Display Research
Laboratory
 Room 101, Prosperous
 Building, 48-52 Des
 Voeux Rd., Central,
 Hong Kong.
DiVA
 617/491-4147; fax
 617/491-2208.
E-Machines
 503/646-6699, 800/344-
 7274; fax 503/641-0946.
Light Source
 415/461-8000, 800/231-
 7226; fax 415/461-8011.
Macromedia

415/442-0200, 800/288-
 4797; fax 415/442-0190.
Mass Microsystems
 408/522-1200, 800/522-
 7979; fax 408/733-5499.
New Video Corp.
 310/396-4000; fax
 310/396-0282.
Radius
 408/434-1010, 800/227-
 2795; fax 408/434-9575.
RasterOps Corp.
 408/562-4200, 800/729-
 2656; fax 408/562-4065.
SuperMac Technology
 408/245-2202; fax
 408/735-7250.
Truevision
 317/841-0332, 800/344-
 8783; fax 317/576-7700.
VideoLake
 419/891-1090, 800/638-
 5253; fax 419/891-9673.
VideoLogic
 617/494-0530; fax
 617/494-0534.
Workstation
Technologies
 714/250-8983; fax
 714/250-8969.

SEEING THROUGH
SLIDE SCANNERS

Agfa Corp.
 508/658-5600, 800/685-
 4271; fax 508/658-4193.
Barneyscan Corp.
 510/562-2480, 800/933-
 0330; fax 510/562-6451.
Computer Friends
 503/626-2291, 800/547-
 3303; fax 503/643-5379.
Ektron Applied
Imaging
 617/275-0475, 800/735-
 8766; fax 617/271-1997.
Hardware That Fits
 409/760-2400, 800/364-
 9335; fax 409/539-4141.
HSD Microcomputer
USA
 415/964-1400, 800/828-
 5522; fax 415/964-1538.
Imapro Corp.
 613/738-3000; fax
 613/738-5038.
Leaf Systems
 508/460-8300; fax
 508/460-6470.
Microtek
 213/321-2121, 800/654-
 4160; fax 213/538-1193.
Mitsubishi
International
 914/997-4999; fax
 914/997-4976.
Nikon
 516/547-4355, 800/526-
 4566; fax 516/547-0305.
Nisca
 214/242-9696, 800/245-
 7226; fax 214/245-0942.
RasterOps Corp.
 408/562-4200, 800/729-
 2656; fax 408/562-4065.
Santos Technology
 310/320-8888, 800/966-
 9960; fax 310/212-6688.

Sharp Electronics
Corp.
 201/529-9500, 800/237-
 4277; fax 201/529-9637.
Tamarack/Artix
Technologies
 408/956-0144, 800/643-
 0666; fax 408/956-1552.
Umax Technologies
 408/982-0771, 800/562-
 0311; fax 408/982-0776.
Victor Hasselblad
 201/227-7320; fax
 201/227-3249.
XRS
 310/214-1900; fax 310/
 214-1474.

WHAT'S WRONG
WITH THIS
PICTURE?

Abacus Concepts
 510/540-1949, 800/666-
 7828; fax 510/540-0260.
Aldus Corp.
 206/622-5500; fax
 206/343-3360.
Bravo Technologies
 510/841-8552.
Computer Associates
 408/432-1727, 800/531-
 5236; fax 408/433-1749.
Data Description
 607/257-1000.
DeltaPoint
 408/648-4000, 800/446-
 6955; fax 408/648-4020.
The MathWorks
 508/653-1415; fax
 508/653-2997.
Microsoft Corp.
 206/882-8080, 800/426-
 9400; fax 206/883-8101.
Prescience Corp.
 415/543-2252; fax
 415/882-0530.
SAS Institute
 919/677-8000; fax
 919/677-8166.
Spyglass
 217/355-6000; fax
 217/355-8925.
SYSTAT
 708/864-5670; fax
 708/492-3567.
Wolfram Research
 217/398-0700, 800/441-
 6284; fax 217/398-0747.

Public domain soft-
 ware, freeware, and
 shareware are avail-
 able through online
 information services;
 user groups (call
 800/538-9696 ext.
 500 for information
 on a local user
 group); or mail-order
 clearinghouses such
 as Educorp (800/
 843-9497, 619/536-
 9999) or the Public
 Domain Exchange
 (800/331-8125
 outside California,
 408/955-0292). **m**



Seeing the obvious isn't always enough.

Dangerous exceptions. Lurking trends.
 The herd of ordinary statistics programs can't see them.
 Defend yourself with Data Desk – the only
 software designed for Exploratory Data Analysis.
 Call now for a free Mac test flight.
 Because what you don't see can hurt you.

Data Desk®
 607-257-1000

Ireland: (353) 1 766 929 Sweden: (46) 8 25 07 10 Australia: (61) 6 257 6873

Data Desk is a registered trademark of Data Description, Inc.

Circle 108 on reader service card

User
Friendly!



Great values are just
a phone call away.

in
**THE MACWORLD
 SHOPPER**
 Direct Response. Direct Results.

THE MAC SOLUTIONS HOUSE

1 (800) 7-ADVANCE

HOURS (Pacific Time):
Mon-Fri. from 6:00 AM
Saturday 9am to 4pm

1 (800) 723-8262

SERVICE

- Member of the Better Business Bureau
- Toll-Free Ordering & Technical Support
- Express Delivery Available anywhere in the world
- Once you place your order, your system will be configured to YOUR needs, then burned in and tested before shipped
- Education, Government & Technical P.O.'s Accepted



SUPPORT

- All Purchases backed by a 30-Day satisfaction money-back guarantee (see details at bottom)
- TWO-YEAR Service Plan Available: 72-Hour Express Repair 1st Year/ + a 2nd Year Extended Warranty
- Buy with Confidence, as ABC is a strong, rapidly growing company with both Mac & PC experience



LEASING

WE ARE THE MAC LEASING EXPERTS FOR PERSONAL OR BUSINESS LEASING. CALL US TODAY!

THREE GREAT REASONS TO LEASE FROM ABC:

1. LEASING IS TAX DEDUCTIBLE
2. LEASING PROTECTS FROM OBSOLESCENCE
3. 24-HOUR APPROVALS IN MOST CASES

E-Machines & Apple

E-Machines Monitors

E-Machines T-16 II.....\$ 1295/?mo.*

16" Color Trinitron Tube, FOUR Display Resolutions: 13", 16", 19" & 21", Meets World's Toughest Swedish MPR II Standards for Unexcelled Safety, Compatible with Mac IIsi, Ilic, & Quadra Built-In Video

E-Machines T-19 II.....\$ 2295/?mo.*

Extraordinary 19" Display has 19" Color Trinitron Tube, TWO Resolutions: 19" & 21", Meets World's Toughest Swedish MPR II Standards for Unexcelled Safety

E-Machines Boards

Futura Boards

Most Affordable 24-Bit Accelerated Graphics Cards for the Macintosh

FUTURA SX (24-Bit Accel. for 16" Monitors/8-Bit on 19" -- on the fly 8-Bit 16" to 19")...\$ 495

FUTURA MX (24-Bit Accel. Board has on-the-fly 16" & 19" res.).....\$ 795

FUTURA LX (24-Bit Accel. Board has on-the-fly 16", 19", 21" res.).....\$ CALL

DoubleColor Boards

Most Affordable 8-Bit Accelerated Graphics Cards

DOUBLE COLOR LC (8-Bit up to 16" Res on Moc LCs).....\$ 395

DOUBLE COLOR SX (8-Bit up to 19" Res.).....\$ 395

DOUBLE COLOR LX (8-Bit up to 21" Res.).....\$ 595

ColorLink Boards

Integrated EtherNet & Accel. Graphics give high-end Quadra features to lower-cost Macs

COLORLINK SX/T (24-Bit to 16" Res. & 8-Bit to 19" Res.).....\$ 620

COLORLINK DC/T (8-Bit to 16" Res. & 4-Bit to 19" Res.).....\$ 495

Complete Systems - 0% Down Leasing



APPLE/E-MACHINES MAC Ilic SUPERSTATION \$ 297 mo.*

Moc Ilic w/20MB RAM, Quantum 240MB Hard Drive, E-Machines T16 II 16" Trinitron Color Monitor & Futuro MX 24-Bit Accelerated Video Board, Ext. Keyboard, & ABC's EXPRESS 2-YEAR WARRANTY

APPLE/E-MACHINES MAC Ilic TOTAL SYSTEM.....\$ 385 mo.*

Moc Ilic 5/105, T16 II Monitor & Futuro SX Card, Ext. Keyboard, UMAX UC630 Scanner, PLI 44MB Removable Syquest Drive, Apple Personal LaserWriter NTR printer, Quark XPress & Adobe Illustrator Software, & ABC's EXPRESS 2-YEAR WARRANTY

APPLE/E-MACHINES MAC Ilic SYSTEM.....\$ 235 mo.*

Moc Ilic w/9MB RAM, Quantum 240MB Hard Drive, E-Machines T16 II 16" Trinitron Color Monitor & Futuro MX 24 Bit Accel. Video Board, Ext. Keyboard, & ABC's EXPRESS 2-YEAR WARRANTY

* Per Month on Lease. Please Call for Details



APPLE MAC QUADRA 700 SUPERSTATION Moc Quadra 700 w/20MB RAM, Quantum 425 MB Hard Drive, E-Machines T16II Trinitron Color Monitor & 24-Bit Color VRAM, Apple Ext. Keyboard & ABC's EXPRESS 2-YEAR WARRANTY!!

\$297 mo. on lease*

Apple Mac CPUs & Printers

ALL ABC MAC COMPUTERS FEATURE OUR SPECIAL 2-YEAR WARRANTY

APPLE MACINTOSH CPUs

Moc Classic II 4/40.....\$ 1299/\$ 49 mo.*

Moc Classic II 4/80.....\$ 1470/\$ 55 mo.*

Moc LC II 4/40.....\$ 1499/\$ 56 mo.*

Moc LC II 4/80.....\$ 1620/\$ 61 mo.*

Moc IIsi 3/40.....\$ 2050/\$ 77 mo.*

Moc IIsi 5/105.....\$ 2555/\$ 96 mo.*

Moc Ilic 5/120.....\$ 3255/\$ 121 mo.*

Moc Ilic 5/425.....\$ 3835/\$ 143 mo.*

* Per Month on Lease. Please Call for Details

APPLE MACINTOSH CPUs

Quadra 700 B/120.....\$ 4555/\$ 133 mo.*

Quadra 700 B/425.....\$ 5299/\$ 154 mo.*

APPLE PRINTERS

StyleWriter Printer.....\$ 350

Personal LaserWriter LS.....\$ 850

Personal LaserWr NTR.....\$ 1695/\$ 63 mo.*

LaserWriter IIf.....\$ 2795/\$ 103 mo.*

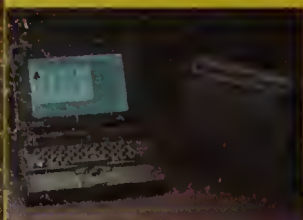
LaserWriter IIg.....\$ 3495/\$ 129 mo.*

Mac PowerBook 140 4/40.....\$ 1995/\$ 74 mo.*

Mac PowerBook 170 8/80.....\$ 4170/\$ 155 mo.*

Mac PowerBook Dream Deal....\$ 5925/\$ 176 mo.*

Moc PowerBook 170 8/80 w/Int. Send/Receive Fax Modem, 8-Bit Color Adapter, Apple 13" Trinitron Color Monitor & Targus Case



C.O.D. ORDERS: ADD \$5.00 on Federal Express. Money Orders & Cashier's Checks are accepted, no company or personal checks please.

Shipping: Please Call for Shipping methods and rates. California residents (only) add 8.25% for sales tax.

Mail Order: Please send money orders or cashier's check for faster service. Allow 10 days for personal checks to clear. If ordering by credit card, include expiration date & billing address.

Return Policy: Call Customer Service at (310) 325-1422 to obtain a return authorization. Returned products must be in original condition and

packaging and must be sent back within 30 days of purchase date. 15% Restocking Fee on opened and used Printers.

Conditions: Prices are subject to change without notice. All items subject to availability. We reserve the right to refuse to sell to anyone.

Credit Cards: We accept Visa, MasterCard, American Express and Discover.

Not responsible for typographical errors. All information presented believed accurate at time of printing. Information subject to change without notice.

1 (800) 723-8262

FOR INTERNATIONAL SALES

CALL: (310) 325-1422

(800) 723-8262 / (310) 325-1422
(310) 325-1422 / (310) 325-1423
2310 Teller Ave. #5, Torrance, CA 90505

**ADVANCE
BUSINESS
CENTER**

Printers



NEWGEN PS 400P
400 DPI Laser Printer \$1695/
\$63 mo.*

NEWGEN PS 880
800 DPI Laser Printer \$3698/
\$145 mo.*



HP COLOR DESKWRITER C \$649

HP DESKWRITER.....\$ 399



SEIKOSHA MAC PRINTER
ImageWriter II Compatible.....\$ 195

DATAPRODUCTS LZR 960 LASERPRINTER.....\$ 1699

MacUser's All-Around Favorite Personal PostScript Printer

GENERAL PARAMETRICS SPECTRASTAR 430 \$5650/203mo.*

MacUser "4 Mice" Winning Color Printer with RISC processor.

NEC SILENTWRITER MODEL 95.....\$ CALL

Excellent 300 DPI PostScript Laser Printer

PRIME OPTION COLORRIGHT PRINTER.....\$ 11995/418 mo.*

Outstanding Resolution from Excellent Color Dye Sub Printer

RASTEROPS CORRECTPRINT 300.....\$ 8849/310 mo.*

24-Bit Color Dye Sublimation Printer at Outstanding Price

TEKTRONIX PHASER III DYE SUB PRINTER.....\$ 9895/399mo.*

RISC-based Full-Color Dye Sub w/Adobe PostScript Level 2

* Please Call for Details

Drives



PLI 44MB SYQUEST REMOVABLE DRIVE..
\$ 595

PLI 88MB SYQ. REMOV. DRIVE.....\$ 695

MAYNARD 2 GIGABYTE BACKUP SYSTEM.....\$ 4695/175 mo.*

Backs up 2 Gigabytes of Data in compact 4MM tape cartridges

MAYNARD PORTABLE 256MB TAPE BACKUP.....\$ 1350/50 mo.*

MICROTECH 40MB PORTABLE HARD DRIVE.....\$ 295

Fast drive in tiny case that needs no external power

NEC INTERSECT CDR-37 CD ROM DRIVE.....\$ 435

New generation of NEC's Portable CD-ROM Player

INTERSECT CDR-74 CD ROM DRIVE.....\$ 635

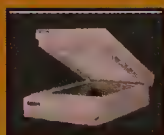
PLI 12MB OPTICAL DRIVE.....\$ 1590/59 mo.*

RICOH 12MB REMOVABLE OPTICAL DRIVE.....\$ 1529/57 mo.*

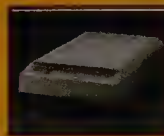
12MB on a 3.5" Removable Optical Cartridge

RICOH 650MB REMOVABLE OPTICAL DRIVE.....\$ 2995/110 mo.*

Peripherals



TAMARACK \$ 1555
ARTISCAN 8000c
(800 x 800 DPI)
24-BIT COLOR SCANNER
INCLUDES ADOBE PHOTOSHOP 2.0.1
or \$ 58*
(p/mo on lease)



UMAX UC-630 \$ 1279
24-BIT COLOR SCANNER
INCLUDES ADOBE PHOTOSHOP 2.0.1
& WDROSTAR OCR SOFTWARE!!
or \$ 49*
(p/mo on lease)

Sale Price / Lease Price (*)

UMAX TRANSPARENCY OPTION.....\$ CALL

UMAX SHEET FEEDER OPTION.....\$ CALL

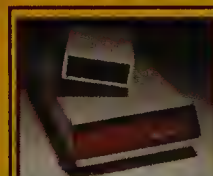
UMAX 1200 DPI SCANNER.....\$ CALL

DAYSTAR UNIVERSAL POWERCACHE ACCELERATOR.....\$ 865

Turbo charges Mac to 40MHz! (requires adapter on some Macs)

KENSINGTON TURBOMOUSE 4.0.....\$ 104

Smooth trackball with amazing software.



PROMETHEUS ULTIMA HOME
OFFICE.....\$ 44B
The Ultimote: 14,000 BPS Modem,
9600 BPS Fax & VoiceMail

PROMETHEUS HOME OFFICE.....\$ 255
2400 BPS Data, 9600 BPS Fax & VoiceMail

GLOBAL VILLAGE POWERPORT GOLD.....\$ 619

Completely Int. PowerBook Modem: 14,000 BPS Data/9600 Fax

POWERPORT SILVER (9600 Data/9600 Fax).....\$ 495

LIND POWERBOOK BATTERY RECHARGER.....\$ 189

Completely de-charges & recharges your PowerBook battery

LIND POWERBOOK EXTERNAL AUX. BATTERY.....\$ 189

MICROTEK 600ZS 24-BIT COLOR SCANNER.....\$ 1295/48 mo.*

High Quality Full Color Scanner

SOPHISTICATED CIRCUITS POWERBOOK KEYPAD.....\$ 89

Sturdy Numeric Keypad plugs in quickly to Mac PowerBooks

SUPRA V.32 BIS FAXMODEM.....\$ 349

14,000 BPS Data & 14,000 BPS Fax, too!

SUPRA FAXMODEM V.32.....\$ 295



TARGUS UNIVERSAL POWERBOOK CASE.
\$ 69
Ideal Case for PowerBook, Portable
Printer, Adapters & Cables!

TARGUS POWERBOOK PREMIERE LEATHER CASE.....\$ 135

WACOM 12"x12" GRAPHICS TABLET.....\$ 689

High Quality Pressure-Sensitive Graphics Tablet w/Cardless Pen

* Please Call for Details

Monitors/Video

NEC 3FGx 15" Monitor.....\$ CALL

Great Quality MultiSync Monitor is both buyer & critic favorite

RADIUS PRECISION COLOR DISPLAY/20".....\$ 2768/\$ 103*

19" Mac Monitor with Exceptional Color & Quality!

RASTEROPS PaintBoard LI.....\$ 845

19" 24-Bit Color Card fits many manufacturers' monitors

SUPERMAC VIDEO SPIGOT.....\$ 495

Capture QuickTime Movies from your Mac!

SEIKO INSTRUMENTS



SEIKO CM 1445 14"
Trinitron Color Monitor
\$ 535

SEIKO COLORPOINT PS PRINTER.....\$ 3695/137 mo.*
Exceptional Color Quality at Affordable Price.

SEIKO COLORPOINT PSX PRINTER.....\$ 6595/237 mo.*
Very Fast Color PostScript-Compatible Printer

SEIKO DT3613 GRAPHICS TABLET.....\$ 295
Complete System with Drawing Pen & 4-Button Cursor

SEIKO SMARTLABEL PRINTER PLUS.....\$ 145
Leading Label Printer & Easy Software



SEIKO SPECTRAPOINT
800 x 400 DPI 24-Bit
Color Scanner
\$ 1995

Software

ADOBE ILLUSTRATOR.....\$ 367

ADOBE PHOTOSHOP.....\$ 435

ALDUS FREEHAND.....\$ 399

ALDUS PAGEMAKER.....\$ 499

CLARIS MACWRITE II.....\$ 99

CLARIS FILEMAKER PRO.....\$ 199

CLARIS WORKS.....\$ 199

MICROSOFT EXCEL 4.0.....\$ 315

MICROSOFT WORD.....\$ 310

QUARK XPRESS 3.1.....\$ 545

MACROMEDIA DIRECTOR.....\$ 839

Product of the Month



SOFTWARE TOOLWORKS MIRACLE
\$ 339
Revolutionary Interactive Keyboard and Amazing
Mac Software that teaches you how to play the
piano, modifying lessons to fit individual's needs.

Blow-Out of the Month

ADOBE PHOTOSHOP 1.7.....\$ 399

The Industry Standard! FREE UPGRADE TO 2.0!

TARGUS UNIVERSAL POWERBOOK CASE.....\$ 69

BLOW-OUT ON ALL OUR TARGUS POWERBOOK CASES!! CALL!!

**ADVANCE
BUSINESS
CENTER**

1 (800) 7-ADVANCE

1 (800) 723-8262

Circle 227 on reader service card



MACBEST

(800)530-5050
 International (816) 741-6587
 Fax (816) 741-6847
 2631A NE Vivion, Suite 27 • Kansas City, MO 64118




 CODs welcome

POWERBOOK 140
 4mb Ram, 40mb HD,
 Kodak M150+ Printer,
 Carrying Case &
 Free Shipping



For the Traveler.

**LC II 4mb Ram, 40mb HD,
 \$2,299.⁰⁰ 12" RGB Monitor,
 Stylewriter Printer
 & GreatWorks**



For the Home Body.

COMPUTERS		MONITORS		PRINTERS		PERIPHERALS	
MAC CLASSIC II, 4MB 40MB	1229.00	APPLE 12" RGB	399.00	STYLEWRITER	349.00	APPLE STANDARD KEYBOARD	89.00
MAC LC II, 4MB 40MB	1399.00	APPLE 13" RGB	679.00	PERSONAL LASER LS	899.00	APPLE EXTENDED KEYBOARD	159.00
MAC LC II, 4MB 80MB	1529.00	APPLE 16" RGB	1199.00	PERSONAL LASER NTR	1689.00	HP SCANJET IIC	1349.00
MAC II SI, 5MB 80MB	2349.00	LAPIS GS PORTRAIT	499.00	LASERWRITER IIF	2549.00	IMAGE TWINCOM 14.4 FAX/MODEM	349.00
MAC II CI, 5MB 1 FLPY	2649.00	LAPIS MONO PORTRAIT w/card	599.00	LASERWRITER IIG	3299.00	KENSINGTON TURBOMOUSE	129.00
MAC II CI, 5MB 105 MB	3049.00	RADIUS PIVOT MONO	699.00	GCC BLP ELITE	1199.00	LAPIS VIDEO CARD 8 BIT COLOR	
QUADRA 700, 4MB 1 FLPY	3899.00	RADIUS COLOR PIVOT	1269.00	GCC BLP ELITE 8	1459.00	FOR APPLE 16" MONITOR	379.00
QUADRA 950, 8MB 1 FLPY	5299.00	RASTER OPS SWEET 16 w/card	1589.00	GCC WIDELWRITER 360	1459.00	MACPRO PLUS KEYBOARD	139.00
PB 140, 8MB 80MB	2429.00	SIGMA POWER PORTRAIT	699.00	HP DESKWRITER	399.00	PSI POWERBOOK FAX/MODEM	199.00
PB 170, 4MB 40MB no modem	3599.00	SEIKO CM1445 14"	569.00	HP DESKWRITER C	699.00	RASTER OPS 24 SX Card	599.00
PB 170, 8MB 80MB	3949.00	SONY 1304 14"	659.00	NEC SILENTWRITER II 95	1449.00	RASTER OPS 24 STV Card	739.00

Monday - Friday 9:00 to 7:00 CDT • Saturday 10:00 to 4:00 CDT • Toll free technical support • Free Federal Express shipping on Apple warranty repairs
 Prices are subject to change without notice (this usually means down) - Always call for the most current prices. International orders are subject to a 5% surcharge. COD orders are shipped via Federal Express only and subject to a shipping and COD charge. Returns subject to a restocking fee. Not responsible for typographical errors. Product names are trademarks or registered trademarks of their respective holders.

Circle 98 on reader service card

Macs 4 Less 1-800-475-MACS
 1-800-475-6227
 Every computer is tested
 before we ship it to you!

The Macs 4 Less Difference
 Most systems are in stock
 One year written warranty
 Knowledgeable staff
 Competitive Prices

<p>\$2,099 with Free Shipping! Classic II Summer System! 10MB RAM 80MB Hard Drive Standard Keyboard Apple Stylewriter Ink Refill Kit</p>	<p>\$2,499 with free shipping! LC II Color System! 6MB RAM & 512K VRAM 80MB Hard Drive 14" Hi-Res Color Monitor Standard Keyboard Apple Stylewriter Ink Refill Kit</p>	<p>All Systems include all cables and hook-ups.</p> <p>Classic II Systems with Apple Keyboard, Mouse and Microphone</p> <table> <tr> <td>4/40</td><td>\$1,249</td> <td>4/80</td><td>\$1,499</td> </tr> <tr> <td>6/80</td><td>\$1,579</td> <td>10/105</td><td>\$1,769</td> </tr> </table> <p>LC II Systems with Apple Keyboard, Mouse, Microphone and 14" Hi-Resolution Color Monitor</p> <table> <tr> <td>4/40</td><td>\$1,799</td> <td>4/80</td><td>\$2,049</td> </tr> <tr> <td>8/80</td><td>\$2,199</td> <td>10/105</td><td>\$2,349</td> </tr> </table> <p>II Si Systems with MacPro-Plus Extended Keyboard, Mouse, Microphone and 14" Hi-Resolution Color Monitor</p> <table> <tr> <td>3/40</td><td>\$2,499</td> <td>5/80</td><td>\$2,799</td> </tr> <tr> <td>5/105</td><td>\$2,849</td> <td>17/240</td><td>\$3,499</td> </tr> </table> <p>II Ci Systems with MacPro-Plus Extended Keyboard, Mouse, 32K Cache Card and 14" Hi-Resolution Color Monitor</p> <table> <tr> <td>5/40</td><td>\$3,329</td> <td>5/80</td><td>\$3,579</td> </tr> <tr> <td>8/80</td><td>\$3,719</td> <td>17/240</td><td>\$4,359</td> </tr> </table> <p>Macs 4 Less Inc. 12407 Mopac Expwy #101-302 Austin, TX 78766-9700 M - F. 8 - 7 Sat: 10 - 4 1-512-251-1151 We accept C.O.D. and Prepaid Orders (Cashiers' Checks and Certified Checks). Prices are subject to change. Returns and refused shipments are subject to a restocking fee. Not responsible for typographical errors.</p>	4/40	\$1,249	4/80	\$1,499	6/80	\$1,579	10/105	\$1,769	4/40	\$1,799	4/80	\$2,049	8/80	\$2,199	10/105	\$2,349	3/40	\$2,499	5/80	\$2,799	5/105	\$2,849	17/240	\$3,499	5/40	\$3,329	5/80	\$3,579	8/80	\$3,719	17/240	\$4,359
4/40	\$1,249		4/80	\$1,499																														
6/80	\$1,579		10/105	\$1,769																														
4/40	\$1,799	4/80	\$2,049																															
8/80	\$2,199	10/105	\$2,349																															
3/40	\$2,499	5/80	\$2,799																															
5/105	\$2,849	17/240	\$3,499																															
5/40	\$3,329	5/80	\$3,579																															
8/80	\$3,719	17/240	\$4,359																															
<p>\$3,479 with Free Shipping! II Si Hot Special! 9MB RAM 105 MB Hard Drive 14" Hi-Res Color Monitor MacPro-Plus Ext. Keyboard NuBus Adapter w/FPU Apple Stylewriter Ink Refill Kit</p>	<p>\$5,299 with Free Shipping! II Ci Business Special! 9MB RAM 105 MB Hard Drive 14" Hi-Res Color Monitor MacPro-Plus Ext. Keyboard NEC Silentwriter 95</p>																																	

Circle 30 on reader service card



Cool The Sun

Half the fun of planting a tree is imagining what it will be like in a few years. Our tree will branch out to shade us from the summer sun, help cool our home and the neighborhood, and conserve energy in the process. It will provide a home for songbirds, and will remind us of the special times we share together.

You can cool and beautify your home, too. Join me and plant a tree. For your free booklet, write: Conservation Trees, The National Arbor Day Foundation, Nebraska City, NE 68410.

 **The National
Arbor Day Foundation**

From the LC II to the Quadra, MacSource is the leader in Sales and Customer Service.

Refill Your Ink Jet
Printer Cartridges for
Half the Cost of New.

JetFill®

For about half the cost of a new ink cartridge you can refill your DeskWriter, StyleWriter, or PaintJet. Odds are if your printer uses ink, you can refill it with the clean and easy to use JetFill process.

HP DeskWriter, StyleWriter, Canon Refill

Two-Pack \$16



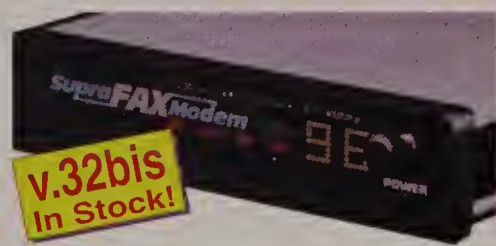
Other JetFill Products

Two-Pack Price
DeskWriter, DeskJet Series \$16
StyleWriter, Canon BJ-10 \$16
EconoPak™ (5 refills, 1 new cartridge) .. \$55
PaintPak (PaintWriter, DeskWriter C) \$49

Available in Black, Red, Green and Blue

**FREE SHIPPING
ON ORDERS OVER \$45***

* Free Shipping Applies to JetFill Products Only



Supra V.32bis Fax/Modem

Up to 57,600 baud throughput. FAXstf Software, and MicroPhone v1.6 **\$369**
Without cable and software **\$299**

**Complete
CI System**

as low as
\$3,150



LC II Systems starting at **\$1,785.**

SI Systems starting at **\$2,275.**

Quadra Systems from **\$4,430.**

Call for Custom Configurations

**Come to the Source! Lower Prices on over
3,000 Macintosh Peripherals and Systems**

MacSource

E-Machines—Lowest Prices!

E-Machines E-16 \$895
E-Machines T-16 II \$1295
E-Machines T-19 \$2495

T-16 II MR

\$1295



**E-Machines Color Cards
as low as \$399**

with EtherNet starting at \$519

For your best E-Machines deal
call Mike at 1-800-285-2622.



PostScript Printers for the Mac

LEXMARK
by IBM

6A (Up to 600 dpi, 6ppm) **\$1890**
10A (600dpi, 10ppm) **\$2850**



(512) 467-9652
FAX (512) 467-2642
Tech Support:
(512) 406-7163

7801 N. Lamar, Ste. E-190
Austin, Texas 78752

CompuServe: 74160.2347 (MacSource) • AOL: MSOURCE

800 285-2622

A Free Call. Nothing per Minute.

© 1992 MacSource. Apple and Macintosh are trademarks of Apple Computer, Inc. All other trademarks are property of their respective owners. Some prices may vary.

Circle 48 on reader service card

SAY YOU SAW IT IN **MACWORLD**.

To purchase products advertised in this issue call the phone numbers below or use the reader service number for ourFastFacts Product Information Card located on the next page.



Page No.	Advertiser	Reader Svc. No.	Phone	Page No.	Advertiser	Reader Svc. No.	Phone	Page No.	Advertiser	Reader Svc. No.	Phone
8-9	Adobe	134	800/833-6687	BC	Kensington	—	800/535-4242	94-95	Radius	—	800/227-2795
246-247	Advanced Business Center	227	800/274-7747	29-36	La Cie	—	800/999-0143	214	RasterOps	—	800/729-2656
55	Agfa Scanners	83	800/685-4271	112	LaserMaster	43	800/950-6868	37	Ray Dream	80	800/846-0111
186-187	Aldus	—	800/685-4163	301	Liberty Systems	45	408/983-1127				
22-23	Apple Care	—	800/365-3690	264	Mac and More	85	800/MAC-0052	122	Salient	39	—
254	APS	31	800/235-2752	244	Mac Center	77	800/950-3726	6	Santos	124	800/966-9960
27	Asante	24	800/662-9686	84-91	Mac Zone, The	70	800/248-0800	70	ScanCo	—	800/722-6263
52	Avery Dennison	160	800/462-8379	192-197	Mac's Place	209	800/367-4222	39	Scitor Corporation	—	415/570-7700
				100	MacAcademy	106	800/527-1914	226	Secure-It	239	800/451-7592
38	Battery Technology	198	800/982-8284	248	MacBest	98	800/530-5050	11	Sharp Electronics Inc.	109	201/529-8731
93	Berkeley Systems Design	8	415/540-5535	56-65	MacConnection	no	800/800-3333	96	Sigma Designs	128	800/845-8086
274-275	Bottom Line Distribution	—	900/420-3636	273	MacDepot	144	800/222-2808	97	Sigma Designs	176/276	800/845-8086
				98-99	MacDirect	58	800/621-8467	10	Software Publishers of America	154	800/233-0555
14	Canon USA	110	800/221-3333	203	MacFriends	—	800/622-8804	68	Specular Int'l.	112	413/549-7600
242	Casady & Greene	67	800/359-4920	266-267	MacLand	40	800/888-8779	71	Statsoft	99	918/583-4149
272	Casady & Greene	32	800/359-4920	270-271	MacNews	79	800/243-9383	50	SuperMac	88	800/334-3005
239	CD Rom Expo	—	—	268-269	MacProducts USA	54	800/MACUSA1	74	Symantec	no	800/441-4714
218	Central Point Software	275	800/947-9445	248	Macs 4 Less	30	800/475-6227				
7	Chinon America, Inc.	64	800/441-0222	249	MacSource	48	800/285-2622	18	T B S P	25	800/755-TBSP
262-263	Club Mac	96	800/854-6227	126-135	MacWarehouse	150	800/255-6227	19	Techworks	131	800/964-1866
69	Compuserve	33	800/848-8199	102	Macworld			49	Tektronix	143	800/835-6100
15	Computer Associates	10	800/CALL-CAI	240-241	Macworld CD Ventures	283	800/845-1924	42-43	Texas Instruments	313	800/527-3500
83	Computer Associates	82	800/CALL-CAI					260-261	Thirdwave Computing	156	800/284-0486
124	Contemporary Cybernetics	188	804/873-9000	236	Macworld Interactive	—	800/848-6645	103-111	Tiger Software	114	800/888-4437
24	Curtis Manufacturing	20	603/532-4123	229	Macworld Expo Toronto	—	—	40	Trendsetter Software	—	800/825-1825
				221	Mass Microsystems	207	800/522-7979	44-45	Wacom	—	800/724-4077
26	Dantz Development	26	510/849-0293	76	Mathsoft, Inc.	34	800/628-4223	226	White Crow Software	92	800/424-0310
245	Data Desk	108	607/257-1000	53	Maxa Corporation	237	800/788-MAXA	114	WordPerfect	—	800/526-5178
120	Data Products	13	800/334-3174	92	Microcom	127	919/490-1277				
72-73	Data Products	38	800/336-3176	222	Microcom	41	919/490-1277	189	Xante Corp.	2	800/926-8839
20	DayStar Digital	86	404/962-2077	118	MicroNet			191	Xante Corp.	1	800/926-8839
259	DGR Technologies	53	800/235-9748		Technology, Inc.	113	714/837-6033	78	Zedcor	161	800/482-4567
258	Dr. Mac	177	800/825-6227	IFC-01	Microsoft	—	—	303	ZyXEL USA	107	800/255-4101
				12-13	Microsoft	—	—				
207	E-Machines	303	800/34GRAPH	IBC	Mirror Technologies	125	800/654-5294				
243	Educational Resources	28	800/624-2926	48	Moustrak	118	800/221-6687				
302	Educorp	157	800/843-9497	223	Multi Ad Services	126	800/447-1950				
185	Electronics for Imaging	22	800/285-4565								
70	Engineered Software	12	919/299-4843	2-3	NEC Technologies	68	800/NEC-INFO				
265	ETC Peripherals	4	800/882-2863	16-17	NEC Technologies	16	800/NEC-INFO				
255	Express Direct	81	800/535-3252	230-231	NEC Technologies	180	800/NEC-INFO				
256-257	Express Direct	78	800/535-3252	227	NISCA Corporation	—	214/242-9696				
				220	Nisus	—	619/481-1477				
182-183	Fifth Generation Systems	130	800/477-8212	66	nVIEW	117	800/736-8439				
201	Fifth Generation Systems	135	800/477-8212								
79	Focus Enhancements	90	800/538-8866	301	O.C.E.A.N. Microsystems	62	800/944-6232				
77	Focus Enhancements	89	800/538-8866	229W	Omron	120	800/362-4411				
80-81	Focus Enhancements	91	800/538-8866	204-205	Outbound	23	800/444-4607				
38	FWB	27	—								
				47	P.S.I. Integration Inc.	61	800/622-1722				
51	GDT Softworks	42	800/663-6222	54	Pastel Development Co.	269	800/756-8553				
224	Graphsoft	46	410/461-9488	101	Peachtree Software	121	800/428-9976				
				232	Phillips Consumer Electronics	—	800/722-6224				
46	Hunt Manufacturing	199	800/765-5669	41	Pinnacle Micro	115	800/553-7070				
				177	Pixar	37	800/888-9856				
217	Image Club	—	800/661-9410	28	Polybus	63	800/695-4239				
213	Insignia Solutions	72	800/848-7677	276	Printer Connection	—	714/758-8832				
211	Insignia Solutions	235	800/848-7677								
116	Iomega	240	800/374-8506	301	Quantum Leap Technologies	103	800/762-2877				

TURN TO THE MACWORLD
SHOPPER ON PAGE 277
TO FIND ADDITIONAL
ADVERTISERS



FASTFACTS

JUST FOR YOU. FREE PRODUCT INFORMATION FROM MACWORLD.

There's no cost; no obligation. Simply fill out the form and circle the numbers on the card below for the products which interest you.

Mail the card. We pay the postage!

Numbers for advertised products can be found in the ad and in both the Product Index and the Advertiser Index.

FASTFAX

For faster results just fax this sheet to 413/637-4343.
Please include your fax number where indicated.

Recycled Paper  Contains 10% Post Consumer Waste



Free Product Info

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50

51 52 53 54 55 56 57 58 59 60
61 62 63 64 65 66 67 68 69 70
71 72 73 74 75 76 77 78 79 80
81 82 83 84 85 86 87 88 89 90
91 92 93 94 95 96 97 98 99 100

101 102 103 104 105 106 107 108 109 110
111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130
131 132 133 134 135 136 137 138 139 140
141 142 143 144 145 146 147 148 149 150

151 152 153 154 155 156 157 158 159 160
161 162 163 164 165 166 167 168 169 170
171 172 173 174 175 176 177 178 179 180
181 182 183 184 185 186 187 188 189 190
191 192 193 194 195 196 197 198 199 200

201 202 203 204 205 206 207 208 209 210
211 212 213 214 215 216 217 218 219 220
221 222 223 224 225 226 227 228 229 230
231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250

251 252 253 254 255 256 257 258 259 260
261 262 263 264 265 266 267 268 269 270
271 272 273 274 275 276 277 278 279 280
281 282 283 284 285 286 287 288 289 290
291 292 293 294 295 296 297 298 299 300

301 302 303 304 305 306 307 308 309 310
311 312 313 314 315 316 317 318 319 320
321 322 323 324 325 326 327 328 329 330
331 332 333 334 335 336 337 338 339 340
341 342 343 344 345 346 347 348 349 350

351 352 353 354 355 356 357 358 359 360
361 362 363 364 365 366 367 368 369 370
371 372 373 374 375 376 377 378 379 380
381 382 383 384 385 386 387 388 389 390
391 392 393 394 395 396 397 398 399 400

MACWORLD



Free Macworld Shopper Info

401 402 403 404 405 406 407 408 409 410
411 412 413 414 415 416 417 418 419 420
421 422 423 424 425 426 427 428 429 430
431 432 433 434 435 436 437 438 439 440
441 442 443 444 445 446 447 448 449 450

451 452 453 454 455 456 457 458 459 460
461 462 463 464 465 466 467 468 469 470
471 472 473 474 475 476 477 478 479 480
481 482 483 484 485 486 487 488 489 490
491 492 493 494 495 496 497 498 499 500

501 502 503 504 505 506 507 508 509 510
511 512 513 514 515 516 517 518 519 520
521 522 523 524 525 526 527 528 529 530
531 532 533 534 535 536 537 538 539 540
541 542 543 544 545 546 547 548 549 550

551 552 553 554 555 556 557 558 559 560
561 562 563 564 565 566 567 568 569 570
571 572 573 574 575 576 577 578 579 580
581 582 583 584 585 586 587 588 589 590
591 592 593 594 595 596 597 598 599 600

Please print or type all information

Name

Title

Co.

Address

City

State

Zip

Phone

Fax

☐ Check box and fill in the appropriate information
to subscribe to Macworld. You will be billed \$19.95
for a 1-year (12 issue) subscription (U.S. only).

Expires December 21, 1992 N1 October 1992



Free Product Info

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50

51 52 53 54 55 56 57 58 59 60
61 62 63 64 65 66 67 68 69 70
71 72 73 74 75 76 77 78 79 80
81 82 83 84 85 86 87 88 89 90
91 92 93 94 95 96 97 98 99 100

101 102 103 104 105 106 107 108 109 110
111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130
131 132 133 134 135 136 137 138 139 140
141 142 143 144 145 146 147 148 149 150

151 152 153 154 155 156 157 158 159 160
161 162 163 164 165 166 167 168 169 170
171 172 173 174 175 176 177 178 179 180
181 182 183 184 185 186 187 188 189 190
191 192 193 194 195 196 197 198 199 200

201 202 203 204 205 206 207 208 209 210
211 212 213 214 215 216 217 218 219 220
221 222 223 224 225 226 227 228 229 230
231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250

251 252 253 254 255 256 257 258 259 260
261 262 263 264 265 266 267 268 269 270
271 272 273 274 275 276 277 278 279 280
281 282 283 284 285 286 287 288 289 290
291 292 293 294 295 296 297 298 299 300

301 302 303 304 305 306 307 308 309 310
311 312 313 314 315 316 317 318 319 320
321 322 323 324 325 326 327 328 329 330
331 332 333 334 335 336 337 338 339 340
341 342 343 344 345 346 347 348 349 350

351 352 353 354 355 356 357 358 359 360
361 362 363 364 365 366 367 368 369 370
371 372 373 374 375 376 377 378 379 380
381 382 383 384 385 386 387 388 389 390
391 392 393 394 395 396 397 398 399 400

MACWORLD



Free Macworld Shopper Info

401 402 403 404 405 406 407 408 409 410
411 412 413 414 415 416 417 418 419 420
421 422 423 424 425 426 427 428 429 430
431 432 433 434 435 436 437 438 439 440
441 442 443 444 445 446 447 448 449 450

451 452 453 454 455 456 457 458 459 460
461 462 463 464 465 466 467 468 469 470
471 472 473 474 475 476 477 478 479 480
481 482 483 484 485 486 487 488 489 490
491 492 493 494 495 496 497 498 499 500

501 502 503 504 505 506 507 508 509 510
511 512 513 514 515 516 517 518 519 520
521 522 523 524 525 526 527 528 529 530
531 532 533 534 535 536 537 538 539 540
541 542 543 544 545 546 547 548 549 550

551 552 553 554 555 556 557 558 559 560
561 562 563 564 565 566 567 568 569 570
571 572 573 574 575 576 577 578 579 580
581 582 583 584 585 586 587 588 589 590
591 592 593 594 595 596 597 598 599 600

Please print or type all information

Name

Title

Co.

Address

City

State

Zip

Phone

Fax

☐ Check box and fill in the appropriate information
to subscribe to Macworld. You will be billed \$19.95
for a 1-year (12 issue) subscription (U.S. only).

Expires December 21, 1992 N2 October 1992

FACTS, FAST!

FREE PRODUCT INFORMATION. Get valuable information about the products that interest you. There's no cost; no obligation. Just fill out this **FASTFACTS** Information form. Circle the numbers for the desired products.

Then mail the card. We pay the postage! For even faster results fill out and send the card via our **FASTFAX**.

Now fast...get the facts, the competition's gaining on you.

MACWORLD



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 215 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

MACWORLD

Reader Service Department
P.O. Box 5299
Pittsfield, MA 01203-9906



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 215 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

MACWORLD

Reader Service Department
P.O. Box 5299
Pittsfield, MA 01203-9906





A QUICK & EASY **PRODUCT INDEX** FROM MACWORLD.

Simply use this index to find the page or advertiser of the products which interest you. Then, use the reader service number for our FastFacts Product Information Card located on the preceding page.

Page No.	Advertiser	Reader Svc. No.	Page No.	Advertiser	Reader Svc. No.	Page No.	Advertiser	Reader Svc. No.	Page No.	Advertiser	Reader Svc. No.
SOFTWARE											
BUSINESS											
22-23	Apple Care	—	223	Multi Ad Services	126	19	Techworks	131	TRAINING		
83	Computer Associates	82	52	Avery Dennison	160	189	Xante Corp.	2	100	MacAcademy	106
245	Data Desk	108	93	Berkeley Systems Design	8	191	Xante Corp.	1	ACCESSORIES		
213	Insignia Solutions	72	218	Central Point Software	275	HARD DISKS/STORAGE					
C2-1	Microsoft	—	26	Dantz Development	26	254	APS	31	FURNITURE		
12-13	Microsoft	—	182-183	Fifth Generation Systems	130	124	Contemporary Cybernetics	188	70	ScanCo	—
54	Pastel Development Co.	269	201	Fifth Generation Systems	135	259	DGR Technologies	53	MISCELLANEOUS		
101	Peachtree Software	121	38	FWB	27	80-81	Focus Enhancements	91	48	Moustrak	118
39	Scitor Corporation	—	51	GDT Softworks	42	116	Iomega	240	8C	Kensington	—
10	Software Publishers of America	154	211	Insignia Solutions	235	29-36	La Cie	—	38	Battery Technology	198
71	Statsoft	99	53	Maxa Corporation	237	301	Liberty Systems	45	46	Hunt Manufacturing	199
18	T B S P	25	92	Microcom	127	266-267	MacLand	40	52	Avery Dennison	160
40	Trendsetter Software	—	222	Microcom	41	268-269	MacProducts USA	54	MAIL ORDER		
226	White Crow Software	92	28	Polybus	63	221	Mass Microsystems	207	246-247	Advanced Business Center	227
114	WordPerfect	—	37	Ray Dream	80	118	MicroNet Technology, Inc.	113	254	APS	31
78	Zedcor	161	122	Salient	39	301	O.C.E.A.N. Microsystems	62	274-275	Bottom Line Distribution	—
CAD/CAM			74	Symantec	—	41	Pinnacle Micro	115	262-263	Club Mac	96
70	Engineered Software	12	VERTICAL			260-261	Thirdwave Computing	156	259	DGR Technologies	53
224	Graphsoft	46	18	T B S P	25	INPUT DEVICES			258	Dr. Mac	177
76	Mathsoft, Inc.	34	WORD PROCESSING			227	NISCA Corporation	—	243	Educational Resources	28
CD ROM			220	Nisus	—	44-45	Wacom	—	302	Educorp	157
102	Macworld CD Ventures	283	MISCELLANEOUS			8C	Kensington	—	265	ETC Peripherals	4
240-241	Macworld CD Ventures	—	51	GDT Softworks	42	MODEMS			256-257	Express Direct	78
236	Macworld Interactive	—	HARDWARE			229W	Omron	120	77	Focus Enhancements	89
301	Quantum Leap Technologies	103	BOARDS			47	P.S.I. Integration Inc.	61	79	Focus Enhancements	90
DATA MANAGEMENT			94-95	Radius	—	303	ZyXEL USA	107	80-81	Focus Enhancements	91
78	Zedcor	161	50	SuperMac	88	NETWORKING			264	Mac and More	85
EDUCATIONAL			CD ROM			19	Techworks	131	248	MacBest	98
243	Educational Resources	28	230-231	NEC Technologies	180	27	Asante	24	244	Mac Center	77
ENTERTAINMENT			COMPUTER SYSTEMS			77	Focus Enhancements	89	56-65	MacConnection	—
242	Casady & Greene	67	255	Express Direct	81	79	Focus Enhancements	90	273	MacDepot	144
FONTS			248	MacBest	98	PRINTERS			248	Macs 4 Less	30
272	Casady & Greene	32	203	MacFriends	—	C3-C5	Mirror Technologies	125	266-267	MacLand	40
217	Image Club	—	248	Macs 4 Less	30	214	RasterOps	—	192-197	Mac's Place	209
GRAPHICS/DTP			249	MacSource	48	189	Xante Corp.	2	268-269	MacProducts USA	54
217	Image Club	—	204-205	Outbound	23	191	Xante Corp.	1	249	MacSource	48
8-9	Adobe	134	270-271	MacNews	79	120	Data Products	13	126-135	MacWarehouse	150
186-187	Aldus	—	274-275	Bottom Line Distribution	—	72-73	Data Products	38	84-91	Mac Zone, The	70
15	Computer Associates	10	DIGITIZERS/SCANNERS			112	LaserMaster	43	276	Printer Connection	—
185	Electronics for Imaging	22	7	Chinon America, Inc.	64	16-17	NEC Technologies	16	103-111	Tiger Software	114
223	Multi Ad Services	126	C3-C5	Mirror Technologies	125	276	Printer Connection	—	260-261	Thirdwave Computing	156
177	Pixar	37	227	NISCA Corporation	—	49	Tektronix	143	SERVICES		
MULTIMEDIA			6	Santos Technology	124	42-43	Texas Instruments	313	ON-LINE		
8-9	Adobe	134	44-45	Wacom	—	256-257	Express Direct	78	69	Compuserve	33
68	Specular Int'l.	112	98-99	MacDirect	58	244	Mac Center	77	TRADESHOWS/CONFERENCES		
PERSONAL			DISPLAY			MISCELLANEOUS					
203	MacFriends	—	255	Express Direct	81	38	Battery Technology	198	CD Rom Expo		
54	Pastel Development Co.	269	207	E-Machines	303	302	Educorp	157	—		
SECURITY			98-99	MacDirect	58	46	Hunt Manufacturing	199	—		
226	Secure-It	239	270-271	MacNews	79	—					
STATISTICAL			2-3	NEC Technologies	68	—					
245	Data Desk	108	66	nVIEW	117	—					
71	Statsoft	99	232	Phillips Consumer Electronics	—	—					
UTILITIES			214	RasterOps	—	—					
242	Casady & Greene	67	11	Sharp Electronics Inc.	109	—					
EXPANSIONS/UPGRADES			96	Sigma Designs	128	—					
20	DayStar Digital	86	97	Sigma Designs	176/276	—					
EXPANSIONS/UPGRADES			EXPANSIONS/UPGRADES			—					
20	DayStar Digital	86	EXPANSIONS/UPGRADES			—					

APS Technologies

Quantum 105 \$349

MACWORLD



"In terms of price per megabyte, this is the best deal. You also get good, fast service and technical support." —MACWORLD, August 1992

DAT

Model	INTL	EXTL
APSDAT	\$1599	\$1699
<i>2.6 GB Compression DAT</i>		
APSDAT	1299	1399
<i>Desktop and Portable Units; Archive-Based Mechanisms; Call for Maxell 60- & 90-meter tapes</i>		
<i>Ask about our Internal DATs for Quadra 900s</i>		
TEAC 155		499
<i>All Tape Drives Include Retrospect</i>		

SyQuest

Model	
SQ-555	\$459
SQ-5110	539

Toshiba

CD-ROM	
3301B	\$699
<i>Includes APS Reference & Entertainment Library</i>	

Maxtor

MB	INTL	EXTL
120	\$359	\$439
213	499	569
340	859	959
535	1249	1349
760	1399	1549
1.2G	1899	1999

Fujitsu

MB	INTL	EXTL
330	\$1099	\$1199
520	1249	1349

Toshiba

MB	INTL	EXTL
830	\$1499	\$1599
<i>800 MBs in your SE, SE/30, ci, Quadra 700</i>		

Quantum

MB	INTL	EXTL
52	\$229	\$299
Go•80	399	N/A
Go•120	559	N/A
105	349	429
120	399	479
240	659	729
425	999	1069

WREN

MB	INTL	EXTL
630	1599	1749
1.2G	1749	1899
1.6G	2549	2699

APS provides internal hard drives for most Macintosh models and external zero-footprint or compact, portable hard drives.

Great Prices. Priceless Support!

- Helpful, knowledgeable sales associates.
- Toll-free technical support—call as often or for as long as you need. See why APS has won 2 MACWORLD Service Hero awards!
- 30-Day, No-Questions-Asked, Money-Back Guarantee.
- Helpful, informative 160-page manual.

- Disk-for-Disk Replacement Warranty—you'll probably never need it, but if you do, 90% of our warranty service is performed within 48 hours (most within 24 hours). Return shipping via FEDEX Standard Overnight Service—no charge.
- 24-hour BBS with the latest version of our software.



M—F 7AM—9PM CST SAT 10AM—4PM CST

Visa/MC, Discover, AMEX—No Surcharge

International: 1-816 478-8300 FAX: 1-816 478-4596 (24 Hrs) Toll Free UK: 0800-897-545 Toll Free Australia: 0014-800-125-875

APS Technologies, 2900 S. 291 Hwy., Independence, MO 64057

1-800 235-2752

A Pivot So Affordable It'll Make Your Head Spin!



IN STOCK!

radius

Video Solutions

Radius Color Pivot/LE

- Portrait and Landscape orientations for both word-processing & spreadsheets
- For Quadra, II series, LC & SE/30
- 15" Color Display
- 832 x 624 • 78 dpi
- 8-Bit, 256 Colors

\$599

With purchase of Color Card

VideoVision

Now Output 24-bit Video Directly to Your VCR



Radius VideoVision

\$2,095

For a Limited Time
FREE
Diva VideoShop
& MacroMedia Action
\$1100 VALUE

- 24-bit Interface Card & External Connector with Video In & Video Out Capability
- 24-bit Convolution Motion allows for flicker free output • Real time video Window Resizing
- On-board International Standards Conversion
- H-bus Architecture & More!

NEW Interfaces

New high-performance Interfaces work with virtually any display!



Radius Precision Color 24Xp

\$499

Accelerated 24-bit color for 12 to 17" displays

Precision Color 24Xk

Accelerated 24-bit color for displays up to 20"

Precision Color 8Xj

Accelerated 8-bit color for displays up to 21"

Call

\$499

Radius Rocket

Rocket 25i 25 MHz 040 **\$1,230**

Rocket 25 25 MHz 040 w/ math chip **\$1,675**

Rocket 33 33 MHz w/ math chip **\$2,095**

AUTHORIZED DIRECT RADIUS RESELLER

1801 W. Larchmont Ave.
Chicago, IL 60613 USA
312.549.0030



"The Mac Systems Company"

UMAX®

Color Scanners

"Umax produced the best images (and) boasts the highest vertical resolution...Umax excels in speed and color accuracy"
MacUser, Dec '91

\$1,245



Umax UC630 Color Scanner

- 600 dpi • 24 bits • Recognizes 16.8 million colors • Supports black/white & gray scale
- Includes Photoshop

"Umax's top-of-the-line scanner offers incomparable image reproduction with optimum speed"

\$3,295



1200 dpi

Umax 1200S Color Scanner

- pictured with optional transparency unit*
- 1200 dpi • One Pass design • 30-bits
- Recognizes 1 billion colors • Supports black/white & gray scale • Includes Photoshop

Call



Umax Transparency Option

- User installable option allows for high-resolution scanning of slides and film transparencies • Works with both the Umax UC630 & 1200S

AUTHORIZED DIRECT UMAX RESELLER

Express Hours (central time).
M-F 8am-7pm; Sat 10am-2pm
24hr Fax, 7 days/week

800-535-3252

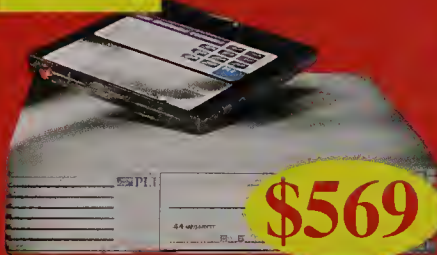
International Orders Shipped Daily
FAX 312.549.6447

PLI

Storage Devices

- FREE 2-year Warranty
- FREE Software & Utilities
- FREE Technical Support
- FREE Data Recovery

★★★★½



\$569

PLI Infinity 44 Removable
comes with cartridge
PLI Infinity 88 Removable \$699

★★★★



\$1,595

PLI Infinity Optical 3.5"
128MB on one 3.5" cartridge.
30-Year Warranty on cartridge!



\$469

PLI Infinity Floptical 21MB
21 megabytes on just one 3.5" floppy.

★★★★

PLIQuick SCSI \$349
Least expensive & fastest NuBus card.

WE CARRY THE FULL LINE OF
PLI STORAGE DEVICES

AUTHORIZED DIRECT PLI
RESELLER

EXPRESS DIRECT
1-800-535-3252

Hi-Resolution, Hi-Speed Solutions!

newgen *The Hi-Res People*

Laser Printers



**NewGen
Turbo PS/300p
Laser Printer**

300 dpi

\$1,295

- Canon engine
- 300 dpi • 35 Fonts
- 16 MHz RISC PostScript processing
- 3MB RAM, upgradeable to 16MB RAM
- PC-Mac autoswitching

Compare NewGen against
anybody's printer



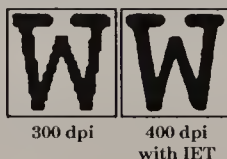
Call

400 dpi NewGen
Turbo PS/400p

- Image Enhancement Technology • 35 fonts
- 16 MHz RISC PostScript processing
- 4MB RAM, expandable to 16MB RAM
- PC-Mac autoswitching • Canon engine

See the High Resolution difference!

Resolution close-up,
13 point Courier enlarged 500%



300 dpi 400 dpi
with IET

600 dpi NewGen
Turbo PS/660

- Image Enhancement Technology level II
- 25 MHz RISC PostScript processing
- SCSI port • Ethernet expandable • 35 fonts
- 6MB RAM, expandable to 16MB RAM
- PC-Mac autoswitching
- Canon engine

New!



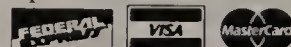
\$3,995

800 dpi NewGen
Turbo PS/880

- Image Enhancement Technology level II
- 25 MHz RISC PostScript processing
- SCSI port & Ethernet port • 35 fonts
- 12MB RAM, expandable to 32MB RAM
- PC-Mac autoswitching • Canon engine

AUTHORIZED DIRECT NEWGEN RESELLER

Easy Payment Options & Leasing Terms We accept money orders, cashiers checks and Visa/MasterCard with no surcharge and your card will not be charged until product ships. Purchase orders are also accepted for those who qualify. Leasing terms available on most products.



Apple/ Mac are trademarks of Apple Computer. Prices subject to change without notice. All returned orders will be subject to a minimum 15% restocking fee plus return shipping. Call for RMA before returning. All warranties on Macintosh or Apple brand products sold by Express Direct will be honored by Express Direct or its authorized agents only. All other manufacturer's warranties still apply.

It's Two Displays for the Price of One!



Display Systems

1-Page & 2-Page

MW EDITORS' CHOICE

"Excellent"
— MacWorld, Sept '92

E-Machines ColorPage T16 II

- 16" Color Display
- Sony Trinitron
- Four Resolutions
- 640 x 480 • 832 x 624
- 1024 x 768 • 1152 x 870
- Compatible with Mac IIsi, IIfx & Quadra built-in video

**SPECIAL
NEW PRICE!**
\$1,295

Color Displays

**NEW
Quadra-Ready 19"**



\$2,395

E-Machines T19 II
19" Dual-Mode Sony Trinitron
1024 x 808 • 1152 x 870

E-Machines ColorPage E16
16" Multi-Resolution Color Display
640 x 480 • 832 x 624 • 1024 x 768

Call

New Color Cards

E-Machines Interface cards work with virtually any display from 12" to 21" including:

- Apple
- Radius
- RasterOps
- Sony
- & More

1 Card Fits All



**from only
\$399**

And E-Machines Cards gives you more performance and a lower price. **CALL US!**

Available features include:

- 8 or 24-bit color
- Acceleration
- Built-in Ethernet Connectivity
- Pan & Zoom
- Virtual Screens
- Video Output Capabilities

**#1 WORLDWIDE
RETAILER**

Nobody sells more E-Machines than Express Direct. So nobody can give you better advice, better support or a better price.



"The Mac Systems Company"

Macintosh Color Systems

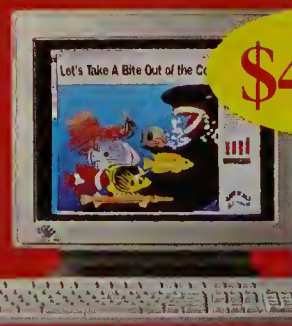
Mac IIsi Color System



\$2,995

Mac IIsi 40, E-Machines E16 16" Color Display, Apple Keyboard & Hypercard

Mac IIfx Color System



\$4,245

Mac IIfx 50, E-Machines T16 II 16" Color Sony Trinitron Display, Apple Keyboard & Hypercard

Mac Systems

WE SPECIALIZE IN BUILDING COMPLETE SYSTEMS

Let Us Tailor a System Perfect for You

Mac IIsi, 40	\$1,945
Mac IIfx, 50	Call
Mac Quadra 700, 400	\$3,945
Mac Quadra 950	NEW!
PowerBook 140, 400	\$2,495
PowerBook 170, 400	\$3,595

The Express Advantage

With Express Direct you always get:

- Low Price & Fast Delivery
- Toll Free Technical Support
- Prompt Customer Service
- Expert Advice & More

Express Hours (central time):
M-F 8am-7pm Sat 10am-2pm
24hr Fax 7 days/week

800-535-3252

International Orders Shipped Daily
FAX 312.549.6447

100% GUARANTEED

Corporate,
educational,
& government
P.O.'s welcome!
Fed I.D. # 95-4183196

International Dealers

Receive the best pricing
and service available
anywhere in the world!

Over 2,500 items
in stock!

Lowest Price

Overnight Delivery only \$3 30-Day Money Back Guarantees

Dr Mac is your best mail order source because we guarantee the lowest prices, overnight delivery, and money back guarantees. If you find any of the products listed here or in our catalog advertised for less in this magazine, we'll meet or beat that price!

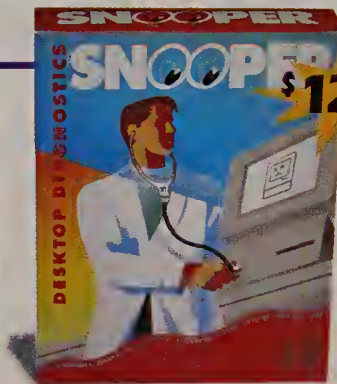
We guarantee overnight delivery to every address in the continental U.S.A! *If you don't get your in-stock order the next day, we pay the shipping! If you are not 100% satisfied with the products you purchased, return within 30 days for a full refund. Please ask if the item you wish to purchase carries a money back guarantee when you order (see policies for details). Let Dr Mac take care of all your Macintosh needs — 100% guaranteed!

FREE!



Call now for
your **FREE**
catalog!

THIS MONTH'S SPECIALS



\$124

SNOOPER

...Lets You Find the Problem

Diagnose from your desk with SNOOPER. SNOOPER performs a comprehensive suite of tests, checks all your hardware and identifies any problems. The same SNOOPER software runs on all Macs. SNOOPER is easy to use and saves time and money. If you already own Norton Utilities, complete your Mac utilities with SNOOPER, the hardware diagnostic.

Snooper Kit w/ NuBus Card.....\$162

ADOBE ILLUSTRATOR 3.2 W/ ATM.....\$358
ADOBE PHOTOSHOP 2.01.....\$535
ALDUS FREEHAND 3.1.....\$388

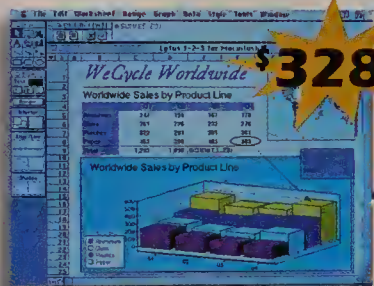


\$32

NEW!

CAPITALIST PIG

Animated business simulation game challenges you to build and run your own business under authentic economic conditions. Experience the challenge of business, scandals, fires, terrorists, and more, as you battle for billions or bankruptcy. Make crucial business decisions every minute, and enjoy the results—or suffer the consequences. Packed with sound, animation and fun, it draws rave reviews from would-be entrepreneurs of all ages. Capitalist Pig is the must-have "Game of the Year". You never knew business could be so stimulating!



\$328

LOTUS 1-2-3 FOR MAC FREE VIDEO WITH PURCHASE

Powerful, graphical, easy-to-use spreadsheet features you won't find anywhere else. Edit text, data, or formulas right in a cell. Or rearrange graph elements in seconds by clicking and dragging them. What's more, enjoy file, macro, and keystroke compatibility with other versions of 1-2-3. Order now and get a free video introducing the great features and functions of Lotus 1-2-3 for the Mac! (While supplies last!)

ALDUS PAGEMAKER 4.2.....\$489
CLARIS FILEMAKER PRO.....\$209
HAYES OPTIMA 9600.....\$429
INSIGNIA UNIVERSAL SOFTPC.....\$192
IOMEGA BERNOLLI 90 MB.....\$778
KODAK DICONIX.....\$369
MAXTOR 60 MB EXTERNAL.....\$316
MULTI-AD CREATOR.....\$498
NEC SILENTWRITER MODEL 95.....\$1449
NORTON UTILITIES 2.0.....\$98
OUARK XPRESS 3.1.....\$548
VIDI PRESENTER PRO.....\$3299



NEW!

\$178

CAUSE

The Personal Programmer.® The object-oriented development tool with a built-in relational database. Totally cross-compatible between the Macintosh & Dos versions. No language or syntax required. Compiles to stand-alone. Version 3.0 now offers full Macintosh interface. Writes documentation automatically. No royalties. Network version available.



\$598

NETWORKS 2.0

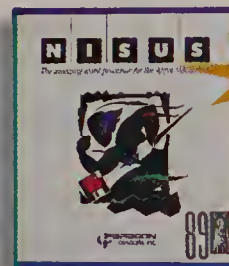
Networks monitors all Apple Talk and TCP/IP devices, free disk space, printer problems, and more. NETWORKS uses pocket pagers, E-mail, screen and voice messages to alert you of problems. Automatic follow-up procedures ensure the problem gets resolved. Reliability statistics and event logs are maintained.



OPTIMA 24 FOR THE MAC

Best buy! V.42/V.42bis and MNP 5 error-control and data compression, 9600 bps throughput, Mac-to-modem cable; standalone modem supports 2400, 1200, and 300 bps.

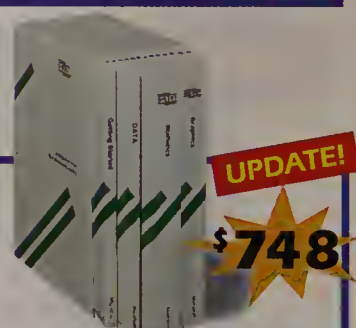
\$153



\$96

NISUS COMPACT 3.3

Word Processing for your new PowerBook. Almost all the power of Nisus 3.06 with less than half the size and cost. Special features for organizing and finding files when you're on the go plus new battery-saver design for disk access.



UPDATE!

\$748

SYSTAT 5.2 for the Mac

Perform a wide variety of statistical analyses and generate numerous graphical representations of analysis results with SYSTAT 5.2. This new version offers more statistical analyses, a reorganized and refined interface that's truly Mac-like, and support for QuickTime, allowing you to view dynamic QuickTime movies of SYSTAT graphics.

Dr Mac

1-800-825-6227

from the
U.S. &
Canada

Fax: (818) 504-9380 or (818) 504-2159

11050 Randall Street, Sun Valley, CA 91352 • (818) 504-1800

POLICIES Credit card is not charged until order is shipped. • **Shipping** - \$3. UPS overnight guaranteed. • **Hardware** over 10 lbs will be shipped ground. • **Money Back Guarantees & returns** - call for RA # before return. Retain original packaging. Restocking fee may apply. Low price guarantee good at time of purchase only.

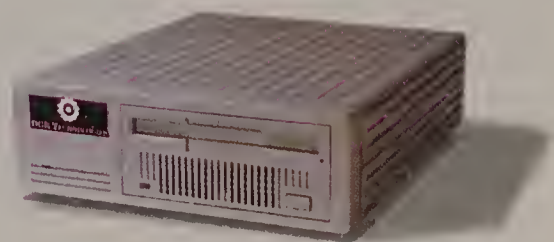
Circle 177 on reader service card

128MB 3.5inch Turbo Optical \$1,299

“The Price/Performance Leader!”

—MacUser Magazine’s July 3.5" Optical Drive Review

Introducing the **latest** in removable optical technology —DGR’s 128 Turbo. This 3.5" 128MB optical drive boasts over a 50% increase in performance over current optical standards. The payback in real-world use is incredible. This **portable** 3.5" drive has an average access time of 34ms with a rotational speed of 3,600 rpm. These features translate into very **fast** data transfer rates — up to 768Kb per second! The 128 Turbo™ is built for the future, conforming to both ANSI and ISO standards, ensuring upward **compatibility**. DGR Price. DGR Performance. DGR Reliability. The DGR Technologies 128 Turbo Optical Drive.



 **FWB**

Every DGR Drive Includes:

- FWB Hard Disk ToolKit PE
- One Year Warranty
- 30-day Money Back Guarantee

DGR 128MB Turbo

\$1299

DGR 128MB REM

\$1199

128MB Cart **\$59**



**Order
Direct**

800-235-9748



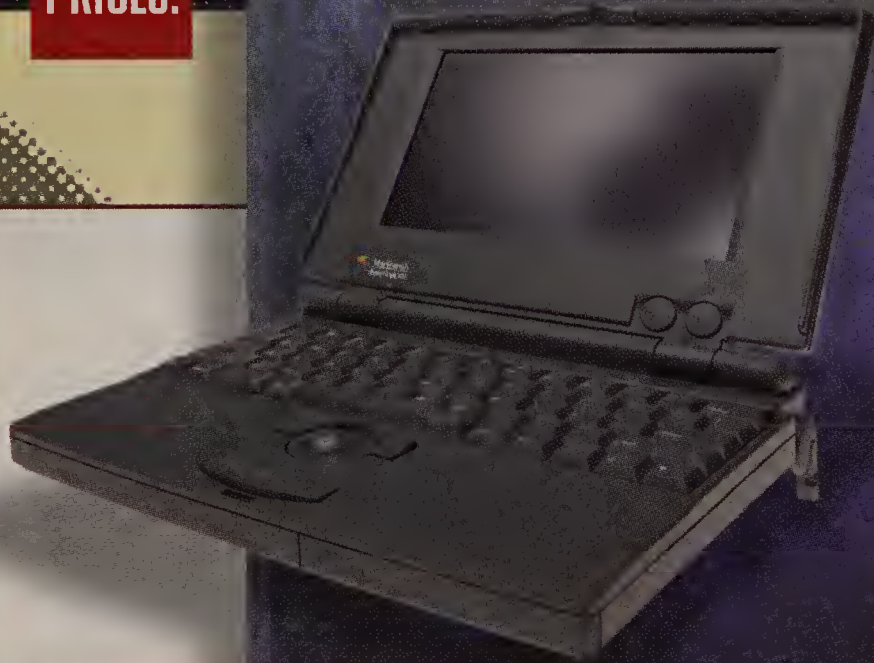
To Order Call TOLL FREE Monday-Friday 8am to 7pm CST
1219 West Sixth, Suite 205 • Austin, Texas 78703 • 512/476-9855 • Fax 512/476-6399
We accept MC, Visa, Discover, Pre-Paid, COD, & Wire Transfer Orders.

AppleLink: D G R

THIRD WAVE SELLS ALL MODELS OF MACS!

**BEST
PRICES!**

QUADRAS—POWERBOOKS



**CALL FOR PRICING
ON ALL MODELS OF
MACINTOSH CPUs**

We can help you design your entire system. Just give one of our sales consultants a call.

THIRD WAVE OPTIDISK 128

The new removable standard!

128MB per cartridge at only 30% the media cost of SyQuest! Plus the data reliability inherent in magneto-optical technology. Prices start at only \$1299 and the 128 MB cartridges are only \$49. Ask about our special offer for qualified service bureaus!

ASANTÉ ETHERNET FROM \$169

5 Year Warranty Rated Number One by MacUser

Thick/Thin or Thick/10T	169.00	SCSI Ethernet from	299.00
Thick/Thin/10T, 64K	229.00	Dayna Etherprint	335.00
Friendly Net/Thin or 10T	229.00	Dayna Etherprint Plus	605.00
10T 12 port hub	529.00	16MHz 882 option	
10T 8 port hub	299.00	for LC Ethernet	49.00
AsantéHub 1012	CALL	20MHz 882 option	
Thick to 10T adapter	99.00	for IIsi Ethernet	69.00

CACHE CARDS, ACCELERATORS, AND COPROCESSORS



**RADIUS ROCKET-
DAYSTAR POWERCACHE-
'MACWORLD EDITORS
CHOICE 1992'**

TokaMac 040 Accelerators
rated faster than the Quadra in
three out of four benchmarks.

MacWeek—10/22/91

Accelerate your Mac IIfx or IIsi by up to 350% with Logica's new line of 68030 accelerators! The LogiCache 50MHz '030 is hundreds of dollars less than DayStar, and has a full 64K of cache RAM (twice as much as DayStar.) For an economical performance boost, try the LogiCache IIfx or IIsi for a 40% speedup. All Logica cards for the IIsi can use the IIsi Dual Slot Adapter, to allow use of the cache card as well as other video or Ethernet cards in your IIsi. Logica math coprocessors for the LC, LC II, and Classic II increase math calculations over 100%. For maximum performance, choose '040 accelerators from Fusion Data or Radius.

LogiCache IIfx 50MHz w/882	1199.00
LogiCache IIfx 50MHz	979.00
LogiCache IIsi 50MHz w/882	1239.00
LogiCache IIsi 50MHz	999.00
LogiCache IIfx 64K Cache	139.00
LogiCache IIsi 64K Cache	149.00
Logica IIsi Dual Slot Adapter	59.00
20 MHz Math chip for Adapter	69.00
DayStar PowerCache 33,40,50 MHz	CALL
DayStar PowerCache above w/882	CALL
Radius Rocket and Radius Rocket 25i	CALL
TokaMac 040 Accelerators for the LC, IIsi, SE 30, IIfx, and the Mac II FX	CALL
Logica LC, LC II, or Classic II FPU	69.00

DISPLAY SYSTEMS



SuperMatch color displays 17 - 21 inches.

Spectrum PDQ and Thunder video cards.

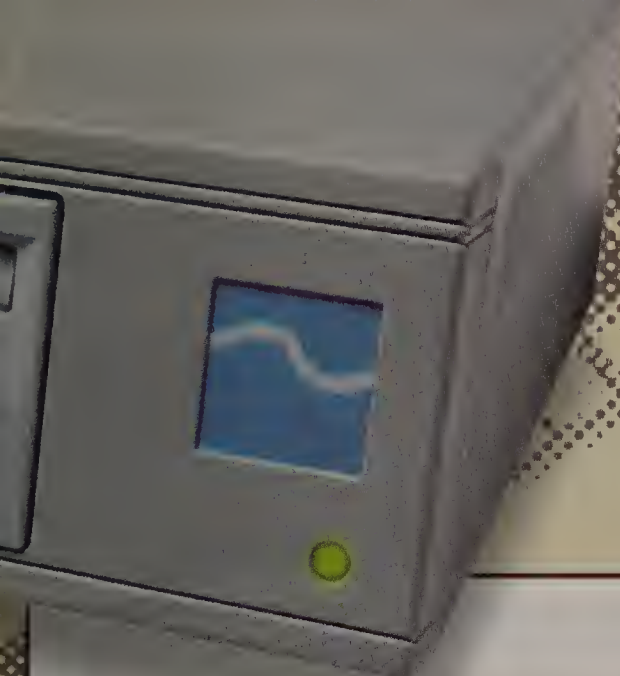
VideoSpigot, VideoSpigot Pro,

Spigot and Sound, Spigot and Sound Pro.

Radius Precision Color products, Radius Pivot, Color Pivot.

We are authorized resellers of Radius, RasterOps, and SuperMac.

Call for latest prices on video.



THIRD WAVE

1(800)880-0099

COMPARE OUR DAT DRIVES TO THEIRS.

	Third Wave OATdrive	The Other Guys
Warranty	5 years	2 years
Price: 2GB	1395.00	1399.00
Compression (8GB)	1595.00	1699.00 (only 5GB)
Firmware Upgrades	From tape	Chip replacement
Upgrade Method	User install	Vendor install
OEM	Hewlett Packard	Archive
Form factor	3.5"	3.5"
MTBF	50,000 hours	40,000 hours
Software	Retrospect	Retrospect

MEDIA

60 MB Tape for Teac	17.00
150 MB Tape for Teac	24.00
SyQuest 45 or 88 MB cartridge	68.00 / 115.00
OAT cassette 60 or 90 meter	17.00 / 29.00
Optical cartridge (ISO) 512 kb/sector	125.00
Optical cartridge (ISO) 1024 kb/sector	125.00
Optical cartridge for Tahiti	269.00
Optical cartridge 128 MB	49.00

SyQuest, Optical, and
OAT available internally
for the Quadra 950!

REMOVABLE MEDIA

OptiDisk 128	1299.00
OptiDisk 128 (SONY)	1595.00
OptiDisk 600 (SONY)	2695.00
OptiDisk 1000	3695.00
45 SR (SyQuest) w/cartridge	475.00
88 SR (SyQuest) w/cartridge	669.00
OATdrive 2GB	1395.00
OATdrive 8GB (five year warranty)	1595.00

DISK DRIVES

	INTERNAL	EXTERNAL
40MB*	N/A	249.00
Go•80**	439.00	519.00
Go•120**	599.00	679.00
120 MB	449.00	539.00
240 MB	719.00	809.00
520 MB	1299.00	1399.00
650 MB	1399.00	1499.00
1000 MB	1999.00	2099.00
1300 MB	2599.00	2699.00
1700 MB	CALL	CALL

DAT



All of our DAT drives include Retrospect 1.3, one DAT cassette, one OAT cleaning cassette, and your choice of SCSI cable.

*One Year Warranty

**Internals for PowerBooks only

MEMORY UPGRADES

Third Wave manufactures a complete line of memory products for all Macs — 1, 2, 4, and 18MB SIMMs, including low profile 18MB SIMMs for the Quadra 700.

We also manufacture pseudo-static PowerBook modules to 6MB and VRAM for the LC and Quadra!

Prices change often —
call for the latest!

ONE, FOUR,
AND SIXTEEN
MB SIMMS

POWERBOOK
2 MB, 4 MB,
AND 6 MB

LC AND
QUADRA VIDEO
RAM

Quantum GO•120 2.5 inch
16ms Internal drive with
Third Wave's 6 megabyte
PowerRAM memory module
—only \$799.00!*

A total of 120MB storage and 8MB
pseudo-static RAM! Send us your
PowerBook and we'll install it free!
*(Includes trade in of Apple 2MB module
and drive, Models 140 and 170 only.
Also available—8/80 for only \$649.00

A SPECIAL OFFER FOR
POWERBOOK OWNERS!

8/120 IN YOUR
POWERBOOK
FOR ONLY \$799!



ADOBE PHOTOSHOP
ONLY \$449!

FEATURING

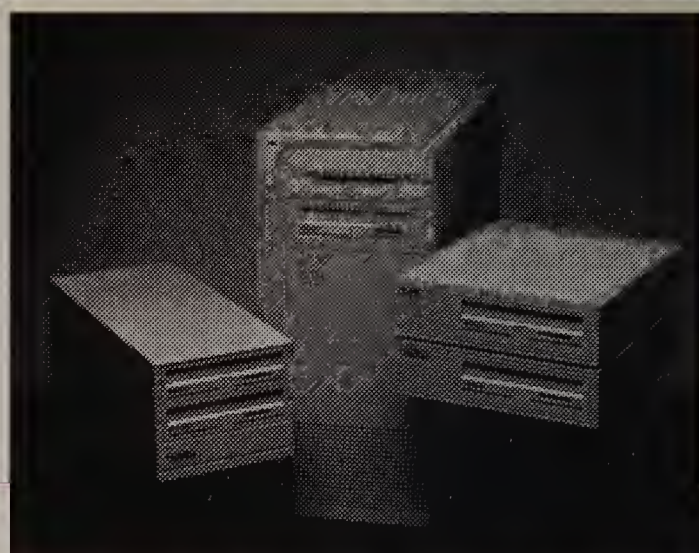


SyQuest®
REMOVABLE
TECHNOLOGY

ClubMac 44mb	SQ555 Actual MAC Capacity: 42mb	\$415
ClubMac 88mb	SQ5110 Actual MAC Capacity: 84mb	\$545
ClubMac Dual 44mb		\$759
ClubMac Dual 88mb		\$979
ClubMac Dual 44mb & 88mb*		\$949
44mb Cartridge		\$64
88mb Cartridge		\$99

SyQuest Drives feature: Industry standard half-height 5.25" form factor • 20 ms average seek time

• Fully embedded SCSI controller • MTBF of 60,000 hours • SyQuest Drives include a **TWO YEAR Warranty**, one cartridge & necessary cables, **SCSI Director™ v.2.4 Formatting Utility** • Includes (1) 44mb & (1) 88mb cartridge • SyQuest Cartridges carry a **ONE YEAR Warranty**



Quantum

Unformatted Capacity	Model	Product Description	Actual MAC Capacity	Internal	External
52mb	LPS50Δ	3.5" Low Profile	9ms	49mb	\$215 \$275
80mb	Go•Drive	2.5" Low Profile	9ms	80mb	\$419 \$519
105mb	LPS105Δ	3.5" Low Profile	9ms	100mb	\$335 \$395
120mb	LPS120	3.5" Low Profile	10ms	116mb	\$409 \$469
120mb	Go•Drive	2.5" Low Profile	9ms	120mb	\$499 \$599
240mb	LPS240	3.5" Low Profile	10ms	234mb	\$649 \$709
425mb	PRO425	3.5" Half Height	8ms	406mb	\$899 \$959

Quantum Drives feature:

• MTBF of 100,000 - 250,000 hrs • **TWO Year Warranty**
ΔLow Power versions (25ms) for Classic, Classic II, LC, LC II, and IIs available.

Quantum's Go•Drive features:

• Fast, lightweight 2.5" form factor drive designed to meet the requirements of battery-powered notebook computers • MTBF of 150,000 hours • **ONE Year Warranty**, ClubMac recommends installation by an authorized dealer to preserve warranty
• 5 volt AC Adapter \$19

**5 YEAR
WARRANTY**

FUJITSU

Unbeatable Quality and Performance

Unformatted Capacity	Model	Product Description	Actual MAC Capacity	Internal	External
330mb	M2622SA	3.5" Half Height	9ms	314mb	\$1079 \$1139
425mb	M2623SA	3.5" Half Height	9ms	405mb	\$969 \$1029
520mb	M2624SA	3.5" Half Height	9ms	496mb	\$1189 \$1249
645mb	M2263	5.25" Full Height	16ms	640mb	\$1259 \$1359
1.2GIG	M2266	5.25" Full Height	14.5ms	1029mb	\$1899 \$1999
2.0GIG	M2652SA	5.25" Full Height	11ms	1665mb	\$2899 \$2999

Fujitsu 3.5" high performance SCSI disk drives features:

• 10MB/s data transfer rate • 6.82 ms average latency • 240 KB read-ahead cache buffer

Fujitsu 5.25" high performance SCSI Winchester disk drives features:

• Embedded SCSI interface • As fast as 14.5 ms positioning time • Up to 4.8 MB/sec SCSI data transfer rate

Maxtor®

Unformatted Capacity	Model	Product Description	Actual MAC Capacity	Internal	External
120mb	7120XT	3.5" Low Profile	15ms	121mb	\$349 \$409
207mb	LXT-213	3.5" Half Height	15ms	202mb	\$595 \$655
330mb	LXT-340	3.5" Half Height	15ms	324mb	\$969 \$1029
535mb	LXT-535	3.5" Low Profile	12ms	510mb	\$1219 \$1279
645mb	XT-8760S	5.25" Full Height	16.5ms	639mb	\$1349 \$1449
1.2GIG	PO-12S	5.25" Full Height	13ms	997mb	\$1799 \$1899
1.7GIG	PO-17S	5.25" Full Height	13ms	1433mb	\$2299 \$2399

Maxtor 3.5" Disk Drives include a **ONE Year Warranty**. Maxtor 5.25" Disk Drives include a **TWO Year Warranty**. * Internal Full Height Drives fit the Mac II, IIfx, and Quadra 900 only.

Seagate

Unformatted Capacity	Model	Product Description	Actual MAC Capacity	Internal	External
248mb	ST3283	3.5" Low Profile	12ms	235mb	\$659 \$719
420mb	ST1480N	3.5" Half Height	14ms	406mb	\$1059 \$1119
525mb	ST1581N	3.5" Half Height	14ms	500mb	\$1198 \$1258
1.2GIG	ST11200N	3.5" Half Height	10.5ms	1000mb	\$2119 \$2179
320mb	ST4385N	5.25" Full Ht W-R	10.7ms	315mb	\$1249* \$1349
645mb	ST4766N	5.25" Full Ht W-6	15.5ms	632mb	\$1285* \$1385
645mb	ST4767N	5.25" Full Ht W-R II	11.9ms	634mb	\$1549* \$1649
1.2GIG	ST41200N	5.25" Full Ht W-7	15ms	989mb	\$1729* \$1829
1.6GIG	ST41651N	5.25" Full Ht W-8	15ms	1350mb	\$2169* \$2269
1.6GIG	ST41600N	5.25" Full Ht E-1	11.5ms	1307mb	\$2429 \$2529
2.1GIG	ST42100N	5.25" Full Ht W-9	12.9	1900mb	\$2949 \$3049
2.4GIG	ST42400N	5.25" Full Ht E-2	11ms	2050mb	\$3649 \$3749

Seagate Drives include a **ONE Year Warranty**

* Internal Full Height Drives fit the Mac II, IIfx, and Quadra 900 only.

Tape Backup Systems

Capacity	Model	Description	Media	Access Time	External
155mb	Teac MT2ST/N50	Analog	CT600N	5-7 MB/sec	\$489
600mb	Teac MT2ST/F50	Analog	CT600F	7-10MB/sec	\$699
2.0GIG	WangDAT 1300XL	DAT, DDS	4mm	10-15 MB/sec	\$1329
3-5GIG	WangDAT 3200	DAT, DDS-DC	4mm	10-15 MB/sec	\$1549
2.0GIG	HP 35470A	DAT, DDS	4mm	10-15 MB/sec	\$1389
3-5GIG	HP 35480A	DAT, DDS-DC	4mm	10-15 MB/sec	\$1819
2.2GIG	Exabyte EXB-8200	Digital/Helical	8mm	10-15 MB/sec	\$1949
5.0GIG	Exabyte EXB-8500	Digital/Helical	8mm	10-15 MB/sec	\$3229

Includes RetroSpect v.1.3c Backup Software & One Tape
and **ONE Year Warranty**

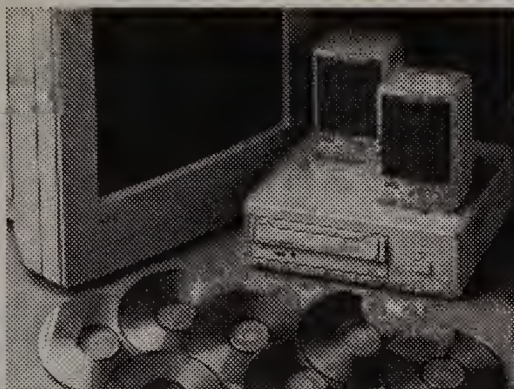
CMO Series . . . The OPTICAL Choice

Model	Capacity	Description	Seek	External
CMO-OD3000	Teac	128mb	3.5" Half Height	45ms \$1195
CMO-LF3004	Panasonic	128mb	3.5" Half Height	45ms \$1185
CMO-3100E	Ricoh	128mb	3.5" Half Height	45ms \$1249
CMO-3600	Ricoh	594/652mb	5.25" Full Height	28ms \$2695
CMO-5030E2	Ricoh	594/652mb	5.25" Full Height	66.7ms \$2149
128mb Cartridge		3.5" Single Sided		\$39
594/652mb Cartridge		5.25" - 512/1024 bytes/sec		\$99

All ClubMac Opticals include **ONE cartridge and ONE Year Warranty**.

NEC

Silentwriter 95
\$1398



MultiSync Monitors

MultiSync 3FGx	\$639
MultiSync 4FG	\$759
MultiSync 5FG	\$1359
MultiSync 6FG	\$2475
Mac FG 8X Interface Card	\$719
Mac FG 24X Interface Card	\$1519

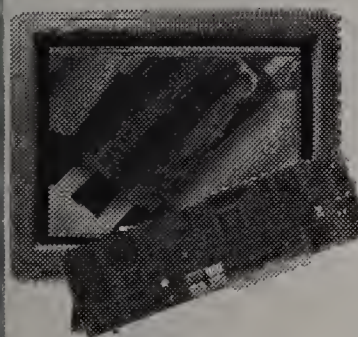
NEC CD-ROMs

CDR-74 Gallery	\$629
CDR-37 Gallery	\$429
CDR-74 with Mac Interface	\$569
CDR-37 with Mac Interface	\$389

- Adobe PostScript Level 2
- 300 dpi • 6 ppm • 35 fonts
- 2MB RAM, up to 5MB
- AppleTalk, Serial, Parallel
- Auto. Interface Monitoring

2MB RAM	\$159
2nd Paper Tray	\$289

RasterOps



Color Display Adapters

RasterOps 24XLi	\$1939
RasterOps PaintBoard 24	\$1549
RasterOps PaintBoard Li	\$835
RasterOps 24Sx	\$619
RasterOps 8XLi	\$929
RasterOps 8XL	\$465
ColorBoard 264/SE30	\$699
ClearVue/GSXL	\$449

Multimedia

MediaTime	\$1549
RasterOps 24STV	\$779
RasterOps 24MXTV	\$1699
RasterOps VideoTime	\$1165
RasterOps Video Expander II	\$465

Monitors

20" Trinitron (2075M)	\$2715
20" Color Hitachi (2085H)	\$1939
ClearVue/SD 21 (with Cable)	\$1399
21" Mono/Gray Scale	\$999
16" Color Monitor	\$1165

ClubMac is your #1 source for RasterOps. We carry the entire line of video and multimedia products. Compare our prices!

DAYSTAR

Lower Prices!

PowerCache

(Mac LC, SE/30, II, IIfx, IIfx+, IIfx, IIfx)

33 MHz PowerCache	\$575
33 MHz PowerCache with 68882 math chip	\$709
40 MHz PowerCache	\$795
40 MHz PowerCache with 68882 math chip	\$975
50 MHz PowerCache	\$1149
50 MHz PowerCache with 68882 math chip	\$1415

(Some models of the IIfx do not provide a socket for the 68030, it is soldered into the motherboard. Price includes socket installation on the IIfx motherboard by DayStar and return shipping UPS Blue.

* Price does not include Cache Adapter Card

Cache Cards

(IIfx model includes DualPort adapter)

FastCache IIfx	\$299
FastCache IIfx with 68882 math chip	\$375
FastCache IIfx	\$215
FastCache 040 (128K cache for Quadra700 & 900)	\$265

Expansion Boards for The Mac LC and Mac IIfx

PowerMath LC	\$115
Equalizer LC (virtual memory upgrade)	\$179
Equalizer LC (includes 68882 math chip)	\$249

ASANTÉ

MACCON 3 64K THICK/THIN/10T (MOST MACS)	\$209
MACCON+ 64K THICK/THIN OR THICK/10T	\$159
FRIENDLYNET ADAPTER THICK OR THIN OR 10T	\$79
EN/SC10T SCSI ETHERNET W/10BASET	\$249
EN/SC10TPB SCSI ETHERNET W/10BASET -PWBK	\$309
EN/SC SCSI ETHERNET THICK,THIN,10BASET	\$349
EN/SCPB THICK,THIN,10BASET-POWERBOOK	\$285
10THUB/12 - 12PORT 10BASET HUB	\$499
10THUB/8 - 8PORT 10BASET HUB	\$249
AH1012 - 12PORT SMART HUB (U/G TO SNMP)	\$825
AH1701 - 12PORT SMART HUB WITH SNMP	\$949
AH1702 - AH1012 W/ASANTE VIEW SW	\$949
AH1704 - AH1701 W/ASANTE VIEW + SNMP	\$1269



MICROTEK
600ZS
Color
Scanner
\$1299

Shipping with Photoshop

radius™ Color Pivot/LE Bundle

The ClubMac Bundle combines the low cost, 15" COLOR full pg display and the Color Pivot Interface. Provides 624 X 832 pixel resolution at 78 dpi. Available with NuBus, IIsi, LC, SE/30 or PowerView.



Call for Special Pricing

Rocket 25i	\$1219
Rocket	\$1629
Rocket 33	\$2029

PrecisionColor 8	\$449
PrecisionColor8X	\$729
PrecisionColor 8XJ	\$515
PrecisionColor 24X	\$1629
PrecisionColor 24XP	\$515
PrecisionColor 24XK	\$859
Color Pivot	\$429
B/W Pivot	\$249
TPD	\$395
PowerView	\$499
VideoVision	\$2069

Displays

PrecisionColor Display/20	\$2759
PrecisionColor Display/19	\$2089
Color Pivot	\$1289
Color Pivot/LE	\$879
Monochrome Pivot	\$699
Full Page Display	\$579
Two Page Display/19	\$899
Two Page Display/21	\$1159



SUPERMAC™

Warranty Program
Graphic Cards • 5 Year
Graphic Displays • 3 Year

Graphic Displays

SuperMatch 20" T Multimode Trinitron	\$2769
SuperMatch 20" Dual Mode Trinitron	\$2519
SuperMatch 20" Color	\$1679
SuperMatch 17" Multimode Color	\$999
21" Platinum (Black and White)	\$999

Graphic Cards

Spectrum 24 Series III	\$1179
Spectrum 8 • 24 PDQ / PDQ si	\$839
Spectrum 8 Series III	\$499
Monochrome Card	\$339

Digital Video Boards

Video Spigot (NuBus / Mac IIsi or Mac LC)	\$499 / 415
Video Spigot Pro (NuBus / Mac IIsi)	\$1335 / 1259
Spigot and Sound	\$749
Spigot and Sound Pro	\$1595

Memory

PowerBook 140/170	Quadra 950
2MB Memory Module	\$117
4MB Memory Module	\$195
6MB Memory Module	\$259
Macintosh Memory	
1mb X 2 - 80ns	\$29
1mb X 8 - 80ns	\$31
2mb X 8 - 80ns	\$64
4mb X 8 - 80ns	\$99
16mb X 8 - 80ns	\$479
	16mb Module \$499
	256 VRAM \$35
	Mac IIfx
	1mb X 8 - 80ns \$38
	4mb X 8 - 80ns \$122
	16mb X 8 - 80ns \$549
	Video (Q700/900)
	256K VRAM \$29

Info, Sales, Int'l (714)768-8130
Tech (714)768-1490 Fax (714)768-9354

ClubMac

1-800-854-6227
3 Musick • Irvine, CA 92718

1-800-854-6227

1-800-854-MACS

1-800-854-6227

Mac and MORE^{ON}

Your Mail Order SuperStore™

	Australia		Germany		Portugal		Switzerland
0014-800-128-806		0130-8-16024		0501-8-12-198		155-9891	
	France		Netherlands		Spain		UK
05-90-0581		06-022-2383		900-94-1460		0800-89-9047	

toll free international fax lines we speak your language...some equipment not available internationally

CPU's and More...

Free 1200 Baud Hayes Modem!

Buy any Apple system and a monitor from Mac and MORE and we'll give you a modem. But supplies are limited; sorry no back orders are available!!!

PowerBook 100 4/40 w/Floppy	\$1499.00
Macintosh PowerBook 140 4/40	\$2569.00
Macintosh PowerBook 170	CALL
Macintosh Classic II 4/40	\$1269.00
Macintosh Classic II 4/105	\$1618.00
Macintosh LC II	In Stock
Macintosh IIsi 3/40	\$1999.00
Macintosh IIfx 5/0	CALL
Macintosh IIfx 4/0	CALL
Macintosh Quadra 700 4/0	\$3999.00
Macintosh Quadra 950 8/0	CALL
ETC PowerGlide 105 Ext. Keyboard	\$99.00
Apple Ext. Keyboard w/CPU Purchase	\$160.00
Apple Std. Keyboard	\$99.00

Systems and More...

Mac LC II Student Package

4 Mb of RAM, 40 Mb internal hard disk, mouse, microphone, keyboard, Apple 12" RGB monitor and StyleWriter printer. Add \$530 for a Personal LS.

PowerBook 170 Pro Traveler

PowerBook 170 8/80, PS/2 Powermodem S/R Fax and Data, Abcom carry case, and the popular Daymaker Personal organizer software.

Mac IIsi Business Package

5 Mb of RAM, 120 Mb hard disk, mouse, microphone, extended keyboard, 14" high resolution RGB monitor and Apple Personal LaserWriter LS.

Quadra 700 Designer Package

Quadra 700 8/213, mouse, microphone, extended keyboard, E-Machines T-16 color monitor, and 1 Mb of VRAM.

We do custom configurations!

Extended Warranty Service for your Macintosh

- 24 month warranty on Apple products
- 72 hour repair or replace turn around
- Shipping via FedEx included both ways

Want more details? Call!

East Coast Sales & Corporate Office

5426 Beaumont Cte Blvd., Suite 300
Tampa, FL 33634

800-945-1MAC

813-886-9534 International
813-888-9535 Corp. Fax
813-881-0634 Fax
800-945-TECH Tech Support

West Coast Sales Office

4730 Walnut, Suite 105
Boulder, CO 80301

800-846-4MAC

303-447-2732 International
303-447-3973 Corp. Fax
303-447-8051 Fax

Best Sellers and More...

Apple 7.0 Personal Upgrade Kit	\$99.00
Abaton InterFax 24/96	\$279.00
Adobe Type Manager 2.0	\$59.00
Adobe Illustrator 3.2	\$379.00
Adobe Photoshop	\$579.00
Adobe Premier 2.0	CALL
Aldus PageMaker 4.2	\$549.00
Aldus Freehand 3.1	\$399.00
Clarix MacDraw Pro	\$285.00
Clarix MacWrite II	\$139.00
Clarix FileMaker Pro	\$215.00
DoveFax Plus Modem	CALL
Kensington Turbo Mouse ADB	\$109.00
Microsoft Word 5.0	\$319.00
Microsoft Excel 4.0	\$309.00
Prometheus ProModem 9600MPlus	\$599.00
Quark Xpress 3.1	\$569.00

Printers and More...

QuickDraw	
Apple ImageWriter II	\$429.00
HP DeskWriter w/ AppleTalk	\$429.00
HP DeskWriter C w/ AppleTalk	\$749.00
TrueType	
ETC DataGlide Wide Carriage Printer	CALL
Apple StyleWriter	\$359.00
Apple Personal LaserWriter LS	\$899.00
Microtek TrueLaser	\$1395.00
PostScript	
Apple Personal LaserWriter NTR	CALL
Apple LaserWriter IIf	\$2829.00
Apple LaserWriter IIfg	\$3599.00
TI microLaser Plus PS17 w/AppleTalk	\$1299.00
TI microLaser Plus PS35 w/AppleTalk	\$1599.00
TI microLaser Turbo w/AppleTalk	CALL
TI microLaser XL PS35 w/AppleTalk	\$2899.00
TI microLaser XL Turbo PS35 w/ AT	CALL
QMS 860	CALL
QMS PS-410	\$1499.00
QMS PS-815MR	\$4099.00
ETC DataBeam TCP	\$4495.00

...we also carry the full line of GCC products!

Networks and More...

Phone network adapters	\$19.00
Asanté FriendlyNet Media Adapters	\$89.00
Asanté FriendlyNet Cards	\$249.00
Asanté MacCon+ 16K Cards	\$199.00
Asanté MacCon+ 64K Cards	\$259.00
Asanté 10T Hub	\$679.00

Accelerators and More...

DayStar 30 Day Money Back Guarantee	restrictions apply
DayStar FastCache IIf	\$163.00
DayStar FastCache IIsi	\$289.00
DayStar 33 MHz PowerCache LC	\$559.00
DayStar 40 MHz PowerCache	\$775.00
DayStar 50 MHz PowerCache	\$1119.00
Raduis Accelerators	CALL

Scanners and More...

NEW Apple One Scanner	\$1099.00
Microtek 600 GS	\$799.00
Microtek 600ZS Color Scanner	\$1329.00
Microtek 1850S	\$1999.00
UMAX UC - 630 Scanner	Special
UMAX 1200S Color Scanner	Ⓢ

Mac and MORE On-line

Call 813.884.7466 to connect

Connect from 300 to 9600 baud: 8 databits, 1 stopbit, no parity, full duplex-to down load Mac and MORE On-line.

Mon - Friday	Saturday	Sunday	Eastern and Mountain
9:00 - 9:00	9:00 - 5:00	12:00 - 5:00	



ETC Peripherals Inc. Hard Drives...

Model	Price	Price
ETC 80 Mb	\$289.00	\$359.00
ETC 120 Mb 15 msec	\$359.00	\$429.00
ETC 213 Mb 15 msec		CALL
ETC 340 Mb 13 msec	\$959.00	\$1029.00
ETC 535 Mb 13 msec	\$1249.00	\$1319.00
ETC 760 Mb 13ms	\$1499.00*	\$1559.00
ETC 1.2 Gb 13 msec	\$2169.00*	\$2279.00
ETC 1.7 Gb 13ms	\$2489.00*	\$2589.00
ETC 52 Mb 12 msec	\$239.00	\$299.00
ETC 105 Mb 12 msec		CALL
ETC 120 MB 11ms	\$425.00	\$495.00
ETC 240 Mb 11ms		CALL
ETC 425 Mb 9 msec	\$1079.00	\$1149.00
ETC 307 Mb WREN-4	\$1129.00*	\$1279.00
ETC 337 Mb WREN Runner 1	\$1279.00*	\$1429.00
ETC 613 Mb WREN-5	\$1349.00*	\$1499.00
ETC 676 Mb WREN-6	\$1399.00*	\$1549.00
ETC 676 Mb WREN Runner-2	\$1649.00*	\$1799.00
ETC 1.2 Gb 15ms	\$1899.00*	\$2049.00
ETC 1.7 Gb 15ms	\$2399.00*	\$2549.00
ETC 330 Mb 3.5" HH, 9ms		CALL
ETC 425 Mb 3.5" HH, 9 ms	\$1039.00	\$1109.00
ETC 520 Mb 3.5" HH, 9 ms	\$1199.00	\$1269.00

*The drives above can be used in the Mac II, IIfx, & 900

Removables and More...

ETC 45R SyQuest Removable	
Low price includes one cartridge.	\$419
ETC Dual 45R/88R SyQuest	
Two removable drives in one box. Includes one of each cartridge! Also available is the ETC 44DR Dual and 88DR Dual Syquest Drives.	\$949
ETC 88R SyQuest Removable	
New low price includes one cartridge. MacUsers four mice winner!	\$549
45 Mb Syquest Cartridge	\$63.00
88 Mb Syquest Cartridge	\$109.00

Specials from ETC Peripherals



ETC DataPress

The first "smart" SCSI data compression interface designed to work external of the Macintosh.

Available in July!

- Features:
- Real-Time™ data compression
 - Allows seven additional SCSI devices to be added to your Mac.
 - Won't interfere with virtual memory
 - Can be added as an internal option to the ETC DataPort Family of removable drives.

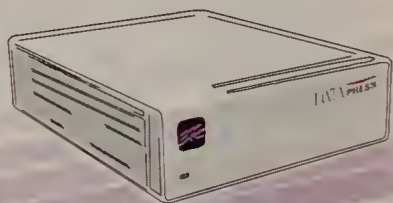
Terms and Conditions: Payment: Mac and MORE accepts Visa, MasterCard, Discover, COOs, and Purchase Orders. COOs are shipped Cash/Certified Check up to \$10,000. Corporate and School Purchase Orders are Net 15 for orders over \$2500 only, and are subject to credit approval. Warranties: All warranties on Macintosh or Apple brand products sold by Mac and MORE will be honored by Mac and MORE or its authorized agents only. Mac and MORE does not guarantee compatibility. Like all other Mail-Order resellers, Mac and MORE is not an authorized Apple reseller. All other manufacturers warranties are honored by Mac and MORE and the original manufacturer. Returns: All orders returned or refused will be charged a minimum 15% restocking fee. Call for an RTS before returning. Returns must be in original packing with software seals unbroken. Shipping: For orders over \$5000 we ship to destinations in the continental US at no charge. Some large items may not be included in this offer. Ask for details when ordering. Terms, Conditions, and Prices are subject to change without notice or obligation. All products sold by Mac and MORE are new. We do not sell used equipment. © 1992 Mac and MORE, Inc. All rights reserved. 920511

October 1992

It's a Vintage Year For Data Compression

The ETC DataPress offers a robust bouquet of features that includes "real-time" hardware data compression, SCSI bus expansion, and more at a price that is pleasing to the palette.

On average, the ETC DataPress doubles the capacity of your drive. It can even compress some files as high as 15-to-1, making the DataPress less expensive than buying another drive for your system.



The making of fine wine is a complicated and time consuming process that should be left to experts. Data compression on the Macintosh® used to be just as difficult—until the invention of the DataPress™.

The DataPress, which ships with *More Disk Space™* by Alysis, offers the fastest and most complete system for



More Disk Space™ from ALYSIS is included with the ETC DataPress to provide the easiest and fastest data compression possible on the Mac!

squeezing space out of your hard disk drive. And its speed is unparalleled. The DataPress doesn't use slow background software tricks. When it writes a file to your hard disk, the data is compressed—"real-time"—so that there

is no chance of lost data or time.

Plus, it's easy to use. Just plug the DataPress into the SCSI port on your Macintosh, and install the software. From there, the DataPress can transparently compress and decompress any file anywhere on your SCSI chain—including those on your internal drive! Just save a file and it's compressed. It's that easy.

Besides data compression, the DataPress enables you to expand the capabilities of your SCSI bus. It is a gateway to another complete SCSI chain of seven additional devices.

And there's more. At the core of the DataPress is ETC's SmartPeripheral™ Engine, an innovation that brings dumb peripherals to life. Empowering them to do things they've never done before. In this engine we've used a Flash EPROM that allows you to add future *SPE Options* by "double-clicking" on an auto-installing icon.

What are *SPE Options*? These are programs that run on the DataPress to add features like: disk mirroring, super volumes, RAID, encryption, and continuous off-line storage of removable magnetic media.

So how do you choose the best data compression solution around? It's a lot less intimidating than choosing a good wine. Call 1-800-876-4ETC.



Innovation on an Economical Scale

ETC Peripherals, Inc., 5426 Beaumont Center Blvd.

Tampa, Florida 33634 • 813-884-2863 • 813-888-9535 fax

DataPress, SmartPeripheral and the ETC logo are trademarks of ETC Peripherals, Inc. Macintosh is a registered trademark of Apple Computer, Inc. More Disk Space is a trademark of Alysis Software, Inc. US Patent Pending © 1992 ETC Peripherals, Inc. All rights reserved

Circle 4 on reader service card

**NEW-
Lower Prices!**

MacLand®



America's Macintosh Hardware Specialists

Quantum

**TWO YEAR
WARRANTY!**

All MacLand Drives are pre-tested, pre-formatted, and come complete with our own installation and reference manual, DiskMaster Plus™ formatting and utility software, cables and two-year warranty. Internal hard drives also include bracket kits to fit your particular Mac.

INTERNAL

EXTERNAL

52MB.....	\$239	52MB.....	\$299
105MB.....	\$349	105MB.....	\$399
120MB.....	\$419	120MB.....	\$459
240MB.....	\$699	240MB.....	\$779
425MB.....	\$999	425MB.....	\$1,099



FWB

MacLand carries the **full line** of FWB quality hard disk drives.
Please call for our latest pricing.

SyQuest
TECHNOLOGY

All MacLand Removable Hard Drives come with our own installation and reference manual, DiskMaster Plus™ formatting utility software, cables, and a one-year warranty. Cartridge not included.

**44 Megabyte
Hard Drives \$399**

Cartridges:
10 Pak-ea.
\$62

5 Pak-ea.
\$63

Singles
\$64

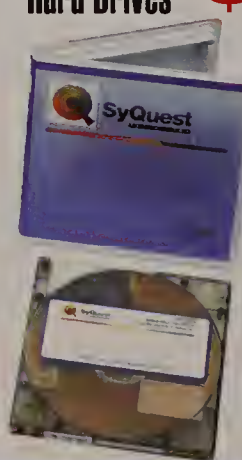


**88 Megabyte
Hard Drives \$449**

Cartridges:
10 Pak-ea.
\$92

5 Pak-ea.
\$95

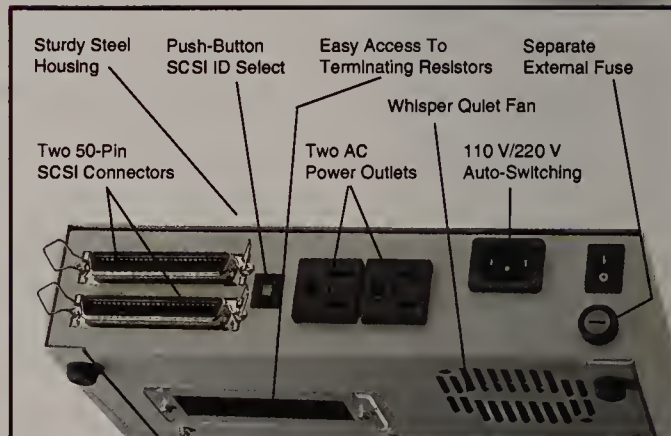
Singles
\$97



RISK-FREE BUYING FROM MACLAND!

*Don't Take Chances On Your Hardware Purchases.
Here's Why Buying From MacLand Makes So Much Sense...*

- MacLand Is A NASDAQ Publicly Traded Company With Over \$3 Million In Assets.
- MacLand Has Been Distributing MacLand Peripheral Products For Over Five Years.
- We Offer Toll-Free Ordering And Technical Support.
- 3-Minute Order Processing...If You're In A Hurry, We Can Take Your Order In An Instant With Our Macintosh Networked Computer System. If You're Not, We Will Take All Of The Time You Need To Make Your Purchase.



Testing, Testing 1-2-3...

That's right, when you purchase a MacLand hard disk drive or removable hard disk drive, you can be assured that your drive has passed our rigorous 10 point quality testing program. We have one of the lowest failure rates in the industry. If, in the unlikely event you do encounter a problem, we take care of you with our 24 hour Rapid Repair program, because we know how important it is for you to keep your system running. Nobody does it quicker or better than MacLand.

MEMORY

1MB 80ns.....	\$35
2MB 80ns.....	\$59
4MB 80ns.....	\$119
LC/VC II VRAM upgrade.....	\$65
Quadra VRAM upgrade.....	\$59

Please call for other upgrades

To Order Call 1-800-888-8779

MacLand, Inc. 4685 S. Ash Ave., Tempe, AZ 85282 (602) 820-5802
24 Hr. Fax: (602) 345-2217

**BORNE
PRESS.**

Circle 40 on reader service card

14" Color Monitor Specials!

**TOLL-FREE
TECHNICAL SUPPORT
1-800-888-8779**



Relisys RE-1422

\$399

One-Year Warranty



Orion MacScan Ultra

\$349

One-Year Warranty



Magnavox

\$429

Two-Year Warranty



MacLand

\$399

Two-Year Warranty

Color Video Card Specials...

Micron

Xceed 8 bit II or SE/30 **\$249**

Xceed 24 bit II or SE/30 **\$419**

Lapis

ColorServer PDS SE/30 14" .. **\$279**

ColorServer PDS SE/30 17" .. **\$399**

ColorServer PDS II 17" **\$399**

RasterOps

ColorBoard 264 SE/30 **\$399**

Microtek 600zs Scanner

\$1,289

MacAcademy

Video Training Tapes

\$39

Monochrome Monitor Specials!

Orion

Technologies

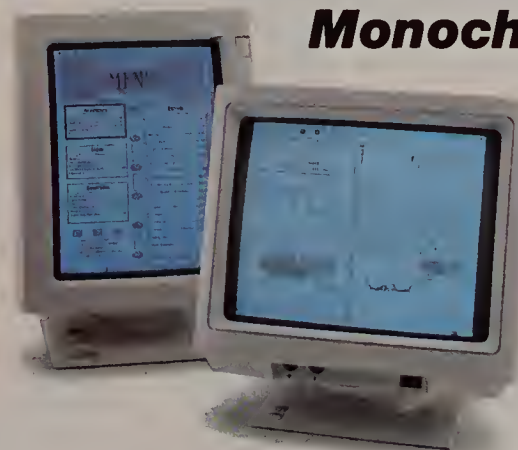
Complete Page Display

\$329

Dual Page Display

\$699

One-Year Warranty



SONY® ...call for latest pricing!

Unbelievable Quality...Unbeatable Price



Qume CrystalPrint Express

The Qume CrystalPrint Express is a lightning-fast laser printer with the muscle to handle the most demanding printing jobs.

↑↑↑↑↑ 1/2

"For impressive speed at an affordable price, nothing beats the CrystalPrint Express"
MacUser Magazine

The Express is backed by a full one-year manufacturer's warranty and MacLand's exclusive 30 day money back guarantee.

- Fast 12 Pages Per Minute
- Legal, Letter, Envelopes and Transparencies
- 3 Megabytes of Ram
- Dual Paper Trays
- 600 x 300 DPI
- 39 Resident Fonts

Only **\$1,999**

C.O.D.'s payable with Cashier's Check or Money Order.

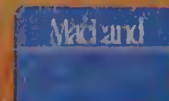
All shipments made by Airborne Express standard Air which is 1-2 day service. Call for shipping costs. Products purchased in error are subject to 20% restocking fee. All prices subject to change without notice. All products subject to availability.

ATTENTION: Businesses, Government, Educational Inst., Military

• Fax us your P.O. for same day shipment! • P.O.'s accepted on approved accounts. • All shipments are FOB origin. • Prices do not include freight. • Favorable terms offered to established accounts. • LEASING option available... Call for details and pricing!

To Order Call 1-800-888-8779

MacLand, Inc. 4685 S. Ash Ave., Tempe, AZ 85282 (602) 820-5802
24 Hr. Fax: (602) 345-2217



MAGIC HARD WORKING TOOLS FOR YOUR MACINTOSH

MAGIC HARD DRIVES

**INTERNAL, EXTERNAL,
REMOVABLE, OPTICAL,
TAPE BACKUP, FLOPTICAL,
AND CUSTOM CONFIGURATIONS**

**MACPRODUCTS HAS BEEN
CONTINUOUSLY SHIPPING
MACINTOSH DRIVES LONGER
THAN ANY OTHER COMPANY!**

ALL MAGIC DRIVES INCLUDE A 1 OR 2 YEAR WARRANTY
AND THE MAGIC 30-DAY MONEY-BACK GUARANTEE

ALL MAGIC EXTERNAL DRIVES INCLUDE CASE WITH 40
WATT POWER SUPPLY, CABLES, AND DRIVER SOFTWARE



FWB HARD DISK TOOLKIT-PE BUNDLED WITH MAGIC HARD DRIVES

NEW!

MAGIC 256MB 3.5" OPTICAL
256MB STORAGE AND 128 DRIVE COMPATIBLE!

MAGIC 128MB TURBO 3.5" OPTICAL
50% FASTER THAN CURRENT 3.5" REMOVABLES!

MAGIC 45R SYQUEST REMOVABLE

"THE MAGIC 45R IS ONE OF BEST SYQUEST
DRIVES AVAILABLE, OFFERING HIGH SPEED AND
HIGH QUALITY" -MACUSER MAGAZINE JULY '90

MAGIC 128REM 3.5" OPTICAL

"THE BEST DESIGN & CONSTRUCTION FOR
THE MONEY" -MACUSER MAGAZINE JULY '92

MAGIC DRIVE KITS: ECONOMY
INTERNAL KIT \$29
FWB TOOLKIT
INTERNAL KIT \$49
EXTERNAL KIT \$99



MAGIC HARD DRIVES

40MB Hard Drive*	\$199
52MB Quantum LP**	\$239
105MB Quantum LP**	\$369
120MB Hard Drive*	\$369
240MB Quantum LP**	\$699
425MB Quantum*	\$999
Magic 600MB Wren Runner*	\$1599
Magic 1.2GB Seagate*	\$1999
Magic 1.5GB -5 Year Warranty!	\$2099

MAGIC 256/128 OPTICAL

3.5" Optical Disk Included With All Magic Optical Drives	
Magic 256MB REM Optical*	\$1699
Magic 128MB Turbo Optical*	\$1299
Magic 128MB REM Optical*	\$1199
Magic 256/128MB 3.5" Cartridges.....	\$99/\$59

MAGIC 45R & 88R

Magic 45R SyQuest Drive**	\$449
Magic 88R SyQuest Drive**	\$499
SyQuest 45 & 88 Cartridges	\$69/\$119

MAGIC TAPE

Tape Included With All Magic Tape Backup Drives	
Magic 150MB Tape Backup*	\$699
Magic 525MB Tape Backup*	\$999
Magic 600MB Tape Backup*	\$999
Magic 2.0GB DAT Backup*	\$1695
Magic 5.0-8.0GB DAT Backup*	\$1999
Magic 2.3GB 8mm Backup*	\$2895
Magic 5.0GB 8mm Backup*	\$3799

MAGIC CD-ROM

Magic Toshiba CD-ROM Drive	\$549
----------------------------------	-------

*1 YEAR WARRANTY **2 YEAR WARRANTY

MAGIC MODEMS

MAGIC HARD WORKING TOOLS FOR YOUR MACINTOSH

MAGIC FAXMODEMS

MAGIC AFX FAXMODEM

2400bps modem. 9600 send & 4800bps receive
class 1, Group 2 & 3 fax, software.....\$89

MAGIC FX FAXMODEM

2400bps modem. 9600bps send & receive
class 2 & Group 3 fax, software.....\$139

MAGIC VFX FAXMODEM

2400bps modem. 9600bps class 2, Group 3 fax,
V.42bis & MNP5, software.....\$189

MAGIC VFX V.32BIS FAXMODEM

14400bps modem. 14400bps class 2, Group 3 fax,
V.42bis/V.32bis & MNP5, software.....\$289

MAGIC MODEMS

MAGIC AMX MODEM

2400bps modem. 100% Hayes compatible.....\$69

MAGIC VX MODEM

2400bps modem with compression to 9600bps.
Hardware V.42bis & MNP5.....\$139

MAGIC VX V.32 MODEM

9600bps modem with compression to 38400bps.
Hardware V.32/V.42bis & MNP5.....\$199

MAGIC VX V.32BIS MODEM

14400bps modem with compression to 57600bps.
Hardware V.32bis/V.42bis & MNP5.....\$259



ALL MAGIC MODEMS INCLUDE A
2 YEAR WARRANTY AND A 30
DAY MONEY BACK GUARANTEE

**EXTERNAL
2400 BAUD
9600 BAUD
& 14400 BAUD
MODEMS &
FAXMODEMS**

**ADVANCED V.42BIS,
V.32BIS & MNP 5
ERROR CHECKING &
DATA COMPRESSION
CAPABILITIES**

NEW!

MAGIC PKT24/96 \$119
POCKET FAXMODEM
1 1/8 X 2 1/2 X 4 3/4. 9V BATTERY POWER
DUAL RJ-11 JACKS, GROUP 3, CLASS 1



LEASE

**LEASE ANY MACINTOSH
SYSTEM OR PERIPHERAL
WITH AFFORDABLE
MONTHLY RATES.
CALL FOR DETAILS.**

**MAGIC RAILGUN 030
ACCELERATORS FOR
MAC SE, PLUS &
CLASSIC.**

**ACCELERATORS AVAILABLE
WITH BUILT-IN LARGE
SCREEN VIDEO OUTPUT**

**MAGIC PERFORMANCE
UPGRADES FOR THE
MAC LC, IISI, IICI,
CLASSIC II, SCSI**



**INCREDIBLE PERFORMANCE FROM
YOUR MAC SE, PLUS, & CLASSIC**

RAILGUN™ 030 SYSTEM V.S. MOBIUS 030

HARDWARE FEATURES	RAILGUN 030 PRO SYSTEM WITH 19" DISPLAY	MOBIUS 030 SYSTEM WITH 19" DISPLAY
CPU SUPPORT	SE, CLASSIC, PLUS	SE, CLASSIC
PROCESSOR	25MHZ MOTOROLA 68030	25MHZ MOTOROLA EC68030
MATH FPU	68882 BUILT-IN	FPU NOT INCLUDED
PMMU	BUILT INTO 68030	NOT INCLUDED
VIDEO PATH	32-BIT	16-BIT
VIDEO CLOCK	16,25,33, & 40MHZ	8MHZ
MONITOR RES.	1152 x 876	1024 x 768
VIDEO SUPPORT	ALL 3RD PARTIES	ONLY MOBIUS DISPLAYS
VIRTUAL RAM	USING VIRTUAL 3.0	NOT AVAILABLE
RAM SUPPORT	UP TO 16MB	UP TO 4MB
BASE PRICE	\$999	\$1099



RAILGUN 030 PRO*

030 Accelerators with Built-in Video Output,
68882 Math CoProcessor, PMMU, &
Panasonic 19" Two Page Display for your
Macintosh SE, Plus, or Classic

16MHz RailGun PRO & 19"\$899
25MHz RailGun PRO & 19"\$999
33MHz RailGun PRO & 19"**\$1299

*Add \$99 for Classic or Plus Version

** 33MHz version includes Virtual 3.0

RAILGUN 030

030 Accelerators for your Macintosh SE, Plus,
or Classic. Optional 68881/2 Math FPU

Magic RailGun 16MHz\$399
Magic RailGun 25MHz\$499
Magic RailGun 33MHz\$699
Math CoProcessor Upgrade.....\$49
RailGun SCSI Accelerator\$49

MAGIC ACCELERATORS

The Magic Math 030 adds System 7 Virtual
memory capabilities and built-in math coprocessor to
your Macintosh LC & Classic II.

Magic LC030 with CoProcessor.....\$199
MagicMath LC CoProcessor.....\$59
MagicMath Classic II CoProcessor.....\$59
Magic IIsi Dual Slot Card with FPU.....\$99
Magic Cache IIsi / IIsi 64k\$169

SCSI ACCELERATOR

Magic SCSI II & Mirror Card.....\$299

MAGIC MEMORY UPGRADES

MAGIC HARD WORKING TOOLS FOR YOUR MACINTOSH

MAGIC MEMORY

Each Magic Memory Upgrade is backed by the
Magic Lifetime Guarantee. Magic SIMMs are
made of the highest quality components and
designed specifically for your hardware.

1MB SIMMs \$26
4MB SIMMs \$99

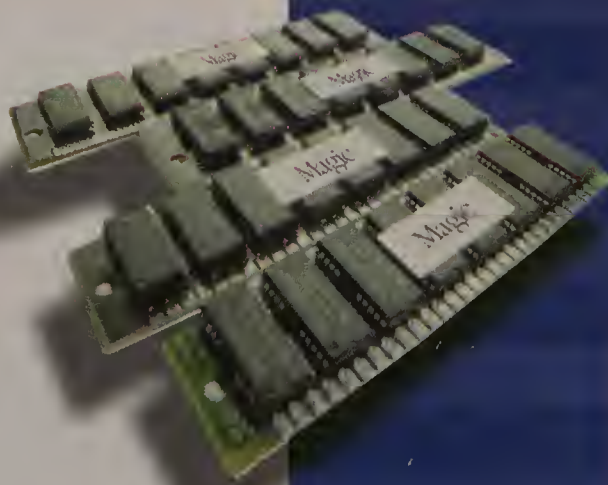
MACINTOSH RAM

1MB SIMMs Starting at \$26
2MB SIMMs\$55
4MB SIMMs\$99
16MB SIMMs\$499
2/4/6MB PowerBook.....\$119/\$229/\$275
4MB Classic Upgrade\$99
LC VRAM\$69
Quadra VRAM\$35

1MB TI RAM \$49
2MB NEC \$159

PRINTER RAM

GCC PLP II/S 1MB.....\$49
LZR960/Realtech/Quickor 8MB Kit\$499
NEC Silentwriter 2 M90 2MB Upgrade....\$249
NEC Silentwriter Model 95 2MB\$159
QMS PS-410/815 4MB Upgrade.....\$239/\$349
TI 1MB RAM Upgrade\$49
TI Turbo RAM UpgradesCall



**A COMPLETE LINE OF
MEMORY UPGRADES
FOR MACINTOSH
COMPUTERS
PRINTERS
& ACCELERATORS**

**ALL MAGIC MEMORY
UPGRADES INCLUDE
A FULL LIFETIME
WARRANTY**



PRODUCTS USA

HARD WORKING SINCE 1985

1 800 622 8721

TEL 512-472-8881
FAX 512-499-0888
SINGAPORE 65-287-5181
MALAYSIA TEL 603-734-7330
CUSTOMER SERVICE
TECHNICAL SUPPORT
RETURNS SUBJECT TO A
PRICES SUBJECT TO

608 WEST 22ND
AUSTIN, TEXAS 78705
CANADA 800-624-9307
FAX 603-736-4295
512-472-8881 EXT. 631
512-472-8881 EXT. 628
RESTOCKING FEE
CHANGE & AVAILABILITY

Monitors to the Macs!

RASTEROPS®

RasterOps Color Systems

20" RasterOps Color Display with 8XL card	\$2445
20" RasterOps Color Display with Accelerated 24-bit card	\$2795
20" RasterOps Color Trinitron with Accelerated 24-bit Card	CALL

RasterOps Color Displays

16" Sweet 16 Color w/card purchase	\$995
20" Trinitron MultiScan Color	\$2745
21" Color Hitachi Quadra-Ready	\$2795

NEW Color Multi-Mode



RasterOps 20" Color Display
Multi-Scan • 640 x 480 to 1024 x 768

NEW RasterOps PaintBoard Li



Accelerated
24-bit Color
for 13" to 20"
Displays

RasterOps Color Boards

8XL 8-bit color	\$459
MX Accelerated 24-bit for 16"	Call
PaintBoard 24 Accel. 24-bit for 13-21"	\$1539
ProColor 32 Accel. 32-bit CMYK	CALL
24STV 24-bit live video for 13"	\$779
24XLTV Live video for large displays	\$2695
MediaTime QuickTime video	CALL
Video Expander (NTSC/PAL)	489

Mac Systems

LC II Color System \$1,995
Mac LC II, 4MB RAM/40HD,
Sony 1320 14" Color Display, Apple
Keyboard, Mouse, System 7 &
Hypercard

Ilisi Productivity System \$2,595
Mac Ilisi 3MB/40HD, Lapis 15"
Full-Page Display, Apple Keyboard,
Mouse, System 7 & Hypercard



Ilisi Color Graphics System
Mac Ilisi 5MB/40HD, Sony 1304
14" Color Display, Apple Keyboard,
Mouse, System 7 & Hypercard

Scanners

Umax UC630 w/Photoshop	1245
Sharp JX-320 w/photoshop	1495
Microtek 600ZS w/Photoshop	1245
Microtek 1850 SlideScanner w/PS	1595
Apple One Scanner	CALL
HP ScanJet IIC	CALL

Modems

Quicktel Xeba 9624 Fax/Receive

Fax and receive
at 9600 bps.
2400 baud with
through-put up to
9600 bps with
V.42bis data
compression.

\$169

Xeba 2400 data modem	89
Xeba 9696 fax w/V.42bis	369
Xeba 14400 fax/receive w/ V.42bis	399

Displays & Cards

DISPLAYS	
Sony 1320/1304	379/629
E-Machines E-16/T-16II	995/1295
Lapis 15" Full-Page Mono/GS	399/499
Lapis 19" Dual-Page Mono/GS	879
Apple 12"/13"	429/699

VIDEO CARDS	
E-Machines DoubleColor & Futura	CALL
Lapis ColorServer Nu Bus	399
Lapis ColorServer PDS/17	399
Lapis ColorServer PDS/21	499

Printers

RASTEROPS®

NEW RasterOps CorrectPrint 300

Color Dye Sub.
300dpi
PostScript
compatible

In-Stock

Call

NEW 1 Year Extended Warranty!

QMS PS-410/860	1495/4295
Apple LaserWriter IIF/IIG	2857/3595
Apple LaserWriter NTR	CALL

TEXAS INSTRUMENTS

TI microLaser PS-17

9ppm,
300dpi,
17 fonts

\$1,245

TI microLaser PS-35	1565
TI microLaser TURBO	1745
TI microLaser XL TURBO	3299

Drives & Storage

PLI Removable 44/88	569/699
PLI Optical 3.5"	1599
PLI Floptical	469
PLI CD-ROM	CALL
Microtech CD-ROM	725
Microtech 150T Tape Backup	799
Microtech 3.5 Optical	1625

Accelerators

All DayStar	CALL
Radius Rocket 25i	1230
Radius Rocket 25/33	1675/2095

radius

NEW Color Pivot/LE

15" Portrait/
Landscape
with purchase
of Interface

In-Stock Special

\$599

DISPLAYS	
Color Pivot/Mono Pivot	1265/695
Two Page Display 19"/21"	895/1159
PrecisionColor 19/20	2095/2795
Full Page Display	595
CARDS	
Clr. Pivot Interface Ilisi, II, LC, SE/30	Call
B/W Pivot Interface	249
TPD Interface	389
24Xp Interface card	499
24Xk Interface card	CALL
8xj Interface card	499
PowerView for PowerBook	499

Mac Cpu's

Mac Classic II, 4/40	1275
NEW Mac LC II, 4/40	CALL
Mac Ilisi, 3/40	1945
Mac Ilisi, 5/0	CALL
Mac Quadra 700 4/0	3945
Mac Quadra 950	NEW
PowerBook 140, 4/40	2495
PowerBook 170, 4/40	3595

Networking

ASANTÉ

All products in stock at lowest prices CALL

Mac News

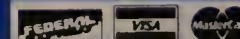
1555 SHERMAN AVENUE
SUITE 361 • EVANSTON, IL 60201

MacNews Hours: M-F 8am-7pm (CT) Sat 10am-2pm

1-800-243-9383

24 HR FAX 312-871-4556

Apple, Mac, are trademarks of Apple Computer. Prices subject to change without notice. All returned orders will be subject to a minimum 15% restocking fee plus return shipping. Call for RMA before returning. All warranties on Macintosh or Apple brand products sold by MacNews will be honored by MacNews or its authorized agents only. All other manufacturer's warranties still apply.



15" Full-Page Power!

For Mac Plus, Classics, SE, SE/30 & PowerBooks



Just Plug It In!

- Plugs directly into SCSI port of your Mac
- No Cards to Buy
- No External Box
- Built-in QuickDraw Acceleration
- Select 72, 80, or 88 dpi
- Available in Granite or Platinum

Sigma Designs Power Portrait

Price indicated for Platinum model only

21" Mono/Grayscale Display

NEW!



\$999

Sigma SilverView Pro Display

- 21" Flat Screen Two-Page • 72 dpi • 1152 x 870
- Compatible with Quadra built-in video (at 256 shades of gray)

SilverView 256 Grayscale Card \$449

- 256 shades of gray for Mac II family

SilverView Monochrome Card \$299

- for SE/30 & IIsi (PDS adapter) or Mac II family

19" Multi-Resolution Grayscale Display

NEW!



\$1,095

Sigma MultiMode 120 Display

- 19" Flat Screen with 6 Selectable Resolutions
- Add card for instantaneous resolution switching from 36 to 120 dpi (up to 1664 x 1200)
- User-selectable 2, 4, 16 or 256 shades of gray

MultiMode 120 Interface Card \$1045

- 256 shades of gray for Mac II family

Mac PowerBooks & PowerBook Systems



\$2,495

Mac PowerBook 140, 4/40


Mac PowerBook 170, 4/40 \$3595

Mac PowerBook 170, 4/80 \$3895

PowerBook & Power Portrait \$3345

PowerBook 140, 4/40 with Granite Power Portrait

We carry PowerBook Accessories too!

Mac  News
1-800-243-9383

24 HOUR INTERNATIONAL SALES FAX 312-871-4556

MacNews specializes in international sales. We stock hardware with 220v power supplies. International shipments are made daily at the most competitive shipping rates.

Circle 79 on reader service card



The last time you could buy 120 top quality fonts for \$179.95, you could have bought the building for the same price.

Building up your font library? Consider a font collection from Casady & Greene. Our typefaces are handcrafted by font designers, *not* machine-scanned. This means the fonts are optimized for fast, crisp printing. Library packages are available in IBM PC-compatible or Macintosh formats. Each package contains *both* PostScript® Type 1 and TrueType™ fonts.

Consider our prices. Casady & Greene has nailed down top-quality fonts at just the right prices!

So don't call your realtor. Contact your favorite software dealer or call:

Fluent Laser Fonts Library 2 - 120 typefaces, suggested retail price \$179.95. A wide variety of text, display, script, and headline fonts.

*Includes Keyboard Drivers, Language Module Support, and Keymapping.



Glasnost Cyrillic Library 2 - 17 typefaces, suggested retail price \$200, supporting Russian, Bulgarian, Byelorussian, Macedonian, Serbian, Ukrainian and English.*

CASADY & GREENE

800-359-4920

22734 Portola Drive, Salinas, CA 93908-1119

Technical Support - (408) 484-9228

Fax: (408) 484-9218

Circle 32 on reader service card

**Lowest Prices
Great Service**

MAC DEPOT™

**Overnight Delivery
30-Day MBG**

HARDWARE

ACCELERATORS

DAYSTAR	
POWERCACHE 33MHZ	639.00
POWERCACHE 40MHZ	879.00
POWERCACHE 50MHZ	1269.00

RADIUS	
ROCKET 25I	1209.00
ROCKET 25MHZ	1615.00
ROCKET 33MHZ	2019.00

DISK DRIVES

MASS MICROSYSTEMS	
DATAPAK 45	499.00
DATAPAK 88	639.00

INPUT DEVICES

COSTAR	
STINGRAY TRACKBALL	85.00

KENSINGTON	
TURBO MOUSE 4.0	105.00

SOFTWARE TOOLWORKS	
MIRACLE PIANO	345.00

WACOM - 30 DAY MONEY BACK GUARANTEE	
6X9 TABLET	479.00
12X12 TABLET (STANDARD)	679.00
12X12 TABLET (ELEC-STATIC)	739.00

MODEMS & FAXES

GLOBAL VILLAGE	
POWERPORT BRONZE	229.00
POWERPORT SILVER	449.00
POWERPORT GOLD	609.00

UMAX

UC-630



With Photoshop . \$1199.00

TELEPORT FULL FAX	229.00
-------------------	--------

PSI	
POWERMODEM	195.00
COMSTATION 1	189.00
COMSTATION 2	279.00
COMSTATION 3 (14.4, V.32)	458.00
COMSTATION 4	329.00
COMSTATION 5 (14.4 FAX)	519.00

SUPRA	
FAX/MODEM V.32BIS	349.00

PRINTERS & SCANNERS

GCC TECHNOLOGIES	
PLP II	CALL
BLP ELITE	CALL

NEWGEN - 30 DAY MONEY BACK GUARANTEE	
TURBO PS/300P (300DPI)	1259.00
TURBO PS/400P (400DPI)	1699.00
TURBO PS/660 (600DPI)	2795.00
TURBO PS/880 (800DPI)	3699.00

UMAX	
UC1200 (1200DPI)	3199.00

MONITORS & VIDEO BOARDS

MICRON	
8BIT VIDEO CARD SE/30	279.00
24BIT VIDEO CARD SE/30	379.00

RADIUS	
POWER VIEW	509.00
PRECISION COLOR 8XJ	499.00
PRECISION COLOR 24XK	799.00
PRECISION COLOR 24XP	499.00
VIDEO VISION	1989.00
21" HITACHI DISPLAY	2199.00

**Corporate,
Educational, and**

SEIKO	
CM1445 HI-RES MONITOR	539.00
SUPERMAC	
THUNDER/24	CALL
VIDEOSPIGOT IISI	345.00
VIDEOSPIGOT NUBUS	419.00
VIDEOSPIGOT & SOUND	755.00

SOFTWARE

BUSINESS

CAERE	
OMNIPAGE	449.00



Hewlett-Packard



3-YEAR WARRANTY

Deskwriter

with cable \$379.00

Deskwriter C

with cable \$619.00

LASERJET IISI	4599.00
SCANJET IIC	1349.00
PAINTJET XL 300	CALL

radius™

**The Deals
of the
Century!**

Color Pivot/LE

~~\$1598.00~~



**256 colors, 832 x 624
resolution, Portrait &
Landscape Orientations**

\$799.00

**Video Card
Included**

DirectColor/GX

~~\$599.00~~



**24-Bit
accelerated
NuBus
video card**

Limited quantity
available

**Exclusive!
\$349.00**

OUR POLICIES

30-day MBG applies to designated manufacturers only. Call customer service at (310) 214-0000 for a Return Authorization. All returns without an authorization number (RA #) will be refused. Returned products must be in original condition and packaging and must be sent back within 30 days of our invoice date. No refunds for freight charges.

Prices and availability of product are subject to change without notice. Personal checks require up to 10 working days to clear. Include: name, address and telephone numbers (no P.O. Boxes please). If ordering by credit card, include expiration date and billing address. California residents (only) add 8.25% for sales tax.



ESTABLISHED 1985

MAC DEPOT™

1-800-222-2808

4453 REDONDO BEACH BLVD.
LAWDALE, CA 90260
Canada Toll-Free: 1-800-548-2512

SNOOPER



**Desktop
Diagnostics**
...
**Lets you
find the
problem**

\$99.00



OMNIPAGE DIRECT	279.00
OMNIPAGE PRO	629.00
CLARIS - 30 Day MBG	
CLARIS WORKS	189.00
FILEMAKER PRO	189.00
MACWRITE II	89.00
MACPROJECT II	339.00
RESOLVE	169.00
MICROSOFT - 30 Day MBG	
EXCEL 4.0	289.00
OFFICE	469.00
WORD 5.0	289.00

DTP & GRAPHICS

ADOBE - 30 Day MBG (Except fonts)	
ADOBE TYPE MANAGER	63.00

PowerBook Accessories

**See the
new
items!**



Targus PremierCase	\$125.00
Universal Case	\$59.00
PNY 2mb module	\$99.00
Newer 6mb module	\$299.00
Notebook Keypad	\$95.00
Quantum 120MB	\$559.00

ILLUSTRATOR w/ATM	359.00
PHOTOSHOP 2.0	545.00
ALDUS - 30 Day MBG	
FREEHAND 3.1	389.00
PAGEMAKER 4.2	489.00
CLARIS - 30 Day MBG	
MACDRAW PRO 1.5	249.00
QUARK - 30 Day MBG	
QUARK X PRESS 3.1	579.00

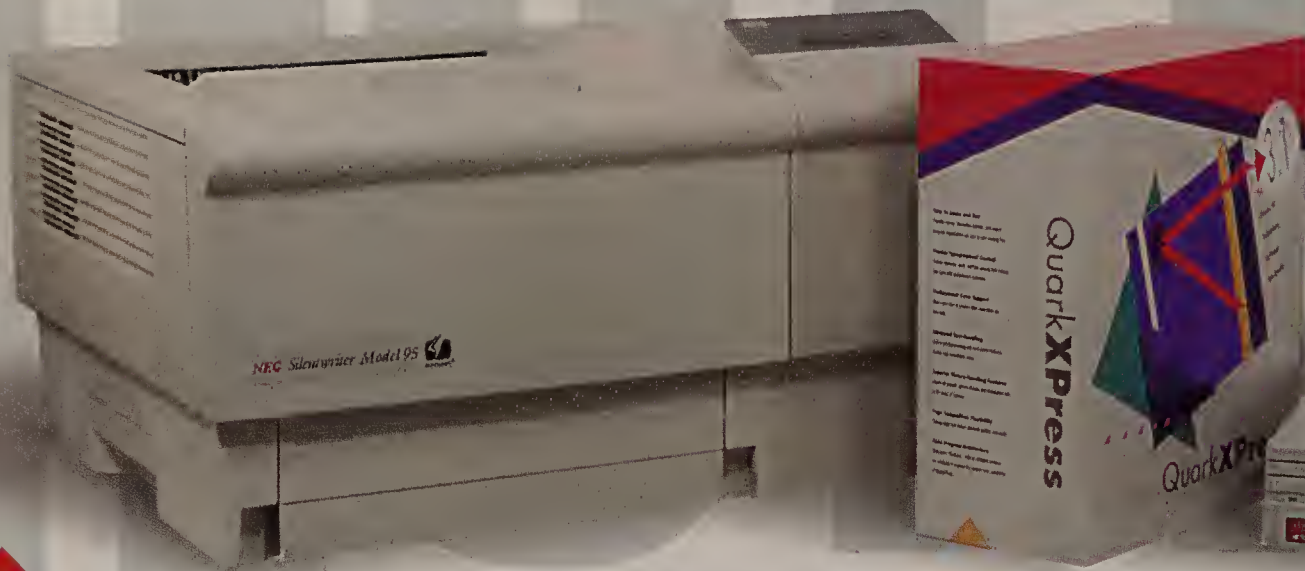
UTILITIES

APPLE	
APPLESHARE 3.0	989.00
APPLETALK REMOTE ACCESS	169.00
QUICKTIME STARTER KIT	149.00
PC EXCHANGE	79.00
SYSTEM 7	90.00
BERKELEY - 30 Day MBG	
AFTER DARK	28.00
FWB - 30 Day MBG	
HARD DISK TOOL KIT	124.00
MAXA - 30 Day MBG	
SNOOPER KIT	149.00
SALIENT SOFTWARE - 30 Day MBG	
AUTODOUBLER	59.00
SYMANTEC - 30 Day MBG	
NORTON UTILITIES V2.0	95.00
SAM	65.00

**Government purchase
orders accepted.**

NEW! Quark XPress 3.1 \$499

Ask about our wide selection of Quark XTensions.



SyQuest 44MB.....	\$62
SyQuest 88MB.....	\$104
3.5" 128MB Carts...	\$59
3.5" 256MB Carts...	\$99

The DGR 128REM:

MacUser's Price/Performance Leader
July 1992 Optical Drive Review



FWB's Hard Disk
ToolKit Lite Included
with DGR 128 REM
& DGR 128 Turbo

NEC
NEC 2MB \$149
NEC 4MB \$289

Silentwriter Model 95 \$1385

300 DPI Postscript Level 2 • Auto PC-Mac Switching
6 pages per minute • 35 Resident Fonts



DGR 128 REM \$1199

128MB optical drive. 42ms access. 512Kb transfer

NEW! DGR 128 Turbo \$1299

128MB portable optical drive. 34ms access. 768Kb Transfer
3.5" 128MB cartridges only \$59

UMAX

Authorized Reseller



All UMAX Scanners Include
Adobe Photoshop 2.01 Software
UMAX 630 -600DPI 24-bit color\$1129
UMAX 630 with Transparency Adapter\$1799
UMAX 1200 -1200DPI 24-bit color\$3085
UMAX 1200 w/Transparency Adapter.....\$3725
Transparency Adapter for 630 or 1200 allows
scanning of transparencies & slides\$679

UMAX 630 Scanner \$1129
600DPI 24-bit Color Scanner



Authorized Reseller



ColorPage E-16 Toshiba Display\$999
ColorPage T-16II Trinitron Display.....\$1299
T-19II Trinitron Display\$2395
Futura SX 24-bit 16" video card.....\$499
Futura MX 24-bit 19" video card\$879
Colorlink EX/T video & ethernet.....\$649
DoubleColor 12, 13, 16" 8-bit video card ...\$399
QuickView Studio Quicktime card.....\$399

**Free 2-Day Air Shipping with
Every E-Machines Purchase!**



Authorized Reseller

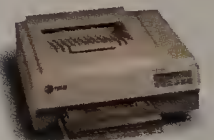


PLI Infinity 45 SyQuest\$519
PLI Infinity 88 SyQuest\$649
PLI 3.5" Sony 128MB Optical.....\$1549
PLI 5.25" Sony 1.0GB Optical\$3725
PLI Sony 3.5" 21MB Floptical\$405
PLI CD-ROM.....\$569
PLI SuperFloppy/Turbo Floppy\$399/\$287
PLI Quick SCSI with Cable.....\$319

PLI 3.5" 128MB Optical \$1549
Sony mechanism • 10 year data life



Authorized Reseller



High Performance 300 & 600DPI Printers
PS/300p - 300DPI/4ppm/2MB\$1225
PS/400p -400DPI/4ppm/4MB\$1675
PS/840 -800DPI/8ppm/6MB\$3025
PS/840e -800DPI/8ppm/6MB.....\$3250
PS/880 -800DPI/8ppm/12MB\$3750
PS/600T -600DPI/Tab/12ppm/12MB.....Call
PS/1200T -1200DPI/Tab/12ppm/20MB.....Call

NewGen PS/630 \$2359
600DPI, 8ppm, 4MB RAM, RISC processor

SYSTEMS

Call for Latest Prices
& PowerBook RAM
& Quadra VRAM



SYSTEM LEASING NOW AVAILABLE
Macintosh Classic II 4/401239
Macintosh Classic II 4/801369
Macintosh LCII 4/401409
Macintosh LCII 4/801525
Macintosh IIsi 3/401879
Macintosh IIsi 5/1052255
Macintosh IIsi 5/02549
Macintosh IIsi 5/1052875
Macintosh IIsi 5/2403249
NEW! PowerBook 145Call
Macintosh PowerBook 140 4/802375
Macintosh PowerBook 170 4/803525
Macintosh PowerBook 170 4/803775
Macintosh Quadra 700/9003899/4099
NEW! Quadra 9505475

Now Included With Macintosh Systems
- FWB Hard Disk ToolKit Personal Ed!

NETWORKING

Asante 10baseT Hub249
Asante MacCon +IIe 16/64k169/225
Asante MacCon +301 16/64k179/349
DaynaPort e/II Mac II Ethernet169
Dayna EtherPrint/EtherPrint Plus329/599
Farallon Star Controller/EN799/975
PhoneNet 10 Pack188
QuickMail 10 User V.2.5359
Shiva Ethergate / FastPath 41262/ 1850
Shiva Netbridge/ Telebridge399

QMS Hammerhead

Introducing the new QMS-860
• 11 x 17 Tabloid/A3 Size
• 25MHz Intel RISC Processor
• 12MB RAM Upgradable to 32MB
• 600DPI, 8ppm Printer Engine
• Adobe Postscript 1 & 2 compatible
• AppleTalk, Serial, Parallel Interface
• Optional EtherTalk Interface
• SCSI Interface
• Complete for only.....\$4099

Timbuktu Remote Access Pak 732

INPUT/OUTPUT

Apple Extended Keyboard170
EMAC Silhouette75
Kensington Turbo Mouse 4.0101
Keytronic MacPro Plus Keyboard115
Mac Recorder Digitizer Only89

MODEMS & FAXES

Global Village Teleport ADB Send/Fax175
Global Village FullFax Send & Receive215
Global Village Powerport465
LogiCode QuikTel Xeba V.42bis374
Prometheus 9696 Send/Receive599
Prometheus Ultima Home Office459
PSI PowerBook Modem175
Supra V.32bis Fax Package349
Supra V.32 Fax Package289
US Robotics Courier 9600 V-32 Dual799
ZOOM 24/96 Send/Receive Fax119

PRINTERS

Apple LaserWriter IIf 20MHz 0302735
Apple LaserWriter IIf 25MHz 0303425
Apple StyleWriter339
NEW Apple Personal LaserWriter NTR1675

GCC PLP II/PLP IIs 799/1099

GCC BLP Elite 4ppm1192
GCC BLP II/BLP IIs1525/1699
Generations Systems PrintersCall
Hewlett Packard LasersCall
Hewlett Packard DeskWriter385
Hewlett Packard DeskWriter C625
LaserMaster High Res PrintersCall
OMS PS-410/8601475/4099
Seiko ColorPoint PS -A Size3575
Tektronix Color Quick InkJet1651

Trinitron Displays

RasterOps 24-bit Accelerated
Paintboard Li & 16" Trinitron \$1499



Sony 1604 -16" Trinitron\$1029
Sony 1304 -14" Trinitron.....\$599

TI microLaser PS XL 17/35 2449/2799

TI MicroLaser Turbo/TurboXL 1499/Call

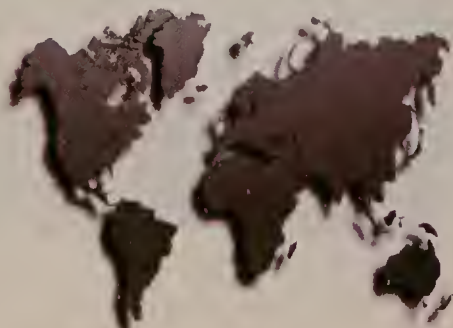
VIDEO SOLUTIONS

Apple 12"/13" HighRes RGB425/639
Apple 16"/21" Color RGB1269/3534
E-Machines T-16II1199
E-Machines Futura SX449
E-Machines Monitors -All ModelsCall
Envisio PowerBook Video Card829
Ikegami CT-20" Trinitron1795
Mass Micro Quick Image 24349
NEC MultiSync 3FGx/4FG635/755
NEC 5FG/6FG1349/2789
Radius Pivot Mono/Color685/1259
Seiko CM-1445539
Sony 1304/1604599/1029

ACCELERATORS & CACHE

AE QuickSilver IIsi /IIsi w/FPU185/245
AE TransWarp LC 33MHz/FPU749/895
Radius Rocket 040 /25i1625/1234
SIMMs: all types/best pricesCall
ATTO IIsi Cache Card149
Motorola PMMU 6885259
Newer Technologies AcceleratorsCall

BOTTOM LINE 24-HOUR INTERNATIONAL SALES FAX (512) 476-6399



Bottom Line Distribution is committed to the needs of the international Macintosh user and reseller. We offer discounted rates with DHL, UPS International, or Federal Express. Delivery times to most countries is 2 to 3 days. We stock 220v versions of most hardware. Dealer inquiries are welcome. Language interpreters are available. Se hace pedidos internacional. Εξυπηρετούμε διεθνής παραγγελίες. Nous acceptons des commandes internationales. Internationale Händlerkonditionen.

日本語での国際取引も扱っております。



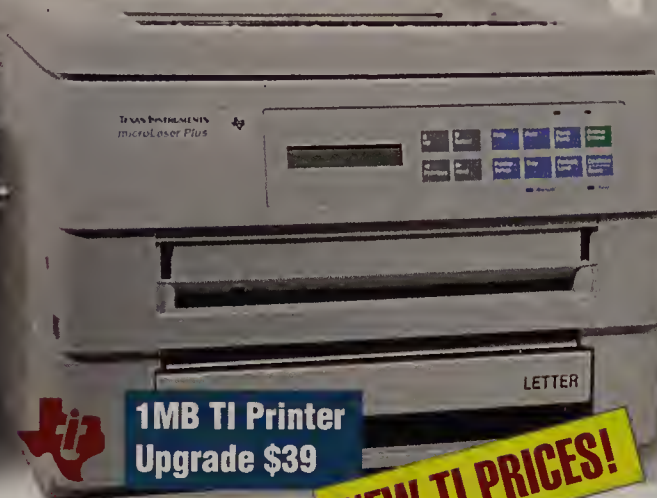
1219 West Sixth, Austin, Texas, USA 78703

WACOM Touch Sensitive Tablets

6x9 Standard	\$449	12x18 Standard	\$959
12x12 Standard	\$649	12x18 Electrostatic	\$1010
12x12 Electrostatic	\$699	18x25 Standard	\$2525

Painter \$199

(with purchase of Wacom Tablet)
Wacom compatible MacUser Eddy
Award Winner from Fractal Design



NEW TI PRICES!

TI microLaser Plus PS/17 **\$1215**

TI microLaser Plus PS/35 **\$1349**

9ppm printer engine • True Adobe Postscript Language
Appletalk interface & 1.5MB RAM included on all models
1MB TI Upgrade **\$39** • Replacement Toner **\$55**

MICROTEK

Microtek 600ZS **\$1149**

600 DPI 24-bit Scanner with Photoshop 2.0 1
& ScanMatch Calibration Software

Microtek 1850S **\$1475**

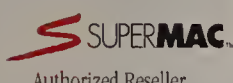
1850 DPI Color Slide Scanner with Photoshop 2.01



1MB TI Printer Upgrade \$39

Turbo microLaser PS/35 **\$1499**

RISC Processor • Postscript Level 2 • Appletalk Interface
16ppm Turbo microLaser PS/35 XL **\$3129**



Authorized Reseller



Authorized Reseller



Authorized Reseller



Authorized Reseller



Spectrum /8•24 PDQ	\$799
Spectrum /Series III 8/24	\$515/\$1375
Spectrum /8 IIsi & LC	\$478
Thunder 8/24 Video Cards	Call
NEW! 17" Color Display	\$975
21" Platinum Display	\$979
SuperMatch 20" Multi Mode Trinitron	\$2725
SuperMatch 20" Color	\$1625

Video Spigot starting at \$399
Thunder Cards - Call!

CorrectPrint 300DPI Dye-Sub Color	\$6899
ProColor 32 CMYK 9-bit DAC	\$2995
8/24XLi Accelerated Video Card	\$899/\$1699
MediaTime -QuickTime Video	\$1499
24s / 24sx -24-bit Video	\$399 / \$599
Video Expander (NTSC/PAL)	\$449
20" Dual Scan Trinitron/Hitachi	\$2639/1899
364 Board Frame Grabber 24-bit 13/14"	\$675

NEW! Paintboard Li \$799
24-bit Accelerated Video Card

Rocket 040 25i/25/33	\$1195/\$1599/\$1985
Radius PowerView PowerBook Video	\$489
Precision Color Interface 8x/24x	\$715/\$1599
Precision Color Display 19"/20"	\$2049/\$2659
Mono Two Page Display 19"/21"	\$885/\$1125
Monochrome Pivot & Card Bundle	\$944
Color Pivot Display	\$1259
NEW! Precision Color 24Xp	\$479

Color Pivot LE & Card \$799
Landscape or portrait view • tilt swivel stand

Accelerators for LC, SE/30, II, IIsi, Hcx, Hci	
All Cards Include Free CPU Slot Adapter!	
33MHz PowerCache	\$545
33MHz PowerCache with 68882 FPU	\$662
40MHz PowerCache	\$740
40MHz PowerCache with 68882 FPU	\$897
50MHz PowerCache	\$1059
FastCache IIsi/Hci	\$265/\$195

Daystar 50MHz PowerCache
with 68882 FPU \$1249

SCANNERS

HP ScanJet IIC	1299
Microtek 600ZS with Photoshop	1149
Microtek 1850 Slidescanner	1475
Sharp JX320 w/Interface	1375
Sharp JX450/600 w/Interface	4159/9989
Tamarack 8000C w/PhotoShop	1499
Umax 630 w/Photoshop	1129
Umax 1200 w/Photoshop	3059

DRIVES & TAPES

Internal or External Drive Kit	29/99
Applied Engineering 1.44 Drive	209
Applied Engineering Plus Drive	283
Bernoulli 90MB w/Interface	814
PLI Super Floppy/Turbo Floppy	399/287
PLI Quick SCSI with Cable	319
Conner 40MB Limited Qty	169
Quantum 105MB LPS	349
Quantum ProDrive 240MB	659
Quantum 425MB	1075
Fujitsu 520MB	1175
Fujitsu 680MB/1.2GB	1255/1875

CD ROM

Chinon CD-ROM	525
---------------	-----

NEC CDR-37 w/Type Gallery	469
NEC CDR-74	616
PLI CD ROM	636
Toshiba CD-ROM XM 3201A	685
Microsoft Office - CD ROM	574
Type Gallery PS	229
NEC Clip Art 3-D	221

SOFTWARE

4th Dimension 2.2	469
Adobe Illustrator 3.2 w/ATM	335
Adobe PhotoShop 2.0	499

Hewlett Packard

HP DeskWriter	\$385
HP DeskWriter C.....	\$625
MacUser Magazine	\$\$\$



Adobe Type Align	62
Adobe Type Reunion/Streamline2	36/115
AfterDark & More After Dark Bundle	37
Aldus Freehand 3.1	369
Aldus PageMaker 4.2A	475
Aldus Superpaint 3.0	129
Aldus Gallery Effects	129
Aldus Persuasion 2.1	299
At Once 1.2	177
AutoDoubler	41
Canvas 3.0	239
Claris Works	184
DiskFit Pro	67
Disk Doubler 3.7	39
Disk Top 4.0	62
Farallon Media Tracks	171
Far Side Calendar	46
Fastback Plus 2.6	115
FileMaker Pro	181
FilmMaker	455
Fontographer 3.5	249
FontMonger	65
Foxbase +Mac 2.01	265
Fractal Design Painter	234
FrameMaker	642
Mac Academy Video Training Tapes	39

MacDraw Pro	249
Mac Globe	39
MacProject II 2.5	329
NEW! Macromind Director 3.1	849
Macromind MediaMaker	449
Managing Your Money 4.0	92
MasterTracks Pro	297
MicroPhone II 4.0	195
Microsoft Excel 4.0	299
NEW! Microsoft Word 5.0	279
Microsoft Office 2.5	489

MS Project	429
MS Works	179
MiniCAD 3.1	469
More 3.1	249
Norton Utilities Mac 2.0	88
OmniPage 3.0/OmniPage Pro	449/629
Passport Encore	335
Passport Midi Interface	63
PixelPaint Professional 2.0	479
Pixar Renderman	559
Quark XPress 3.1	499
Quick Keys II V.2.12	87
Quicken 3.0	38
Retrospect 1.3	131
Soft PC -All Versions	Call
Stratavision 3D 2.0	579
SUM II	87
Swivel 3D Pro	399
Think C 5.0	189
Think Pascal 4.0	159
Typewriter 2.0	122
Vellum 2.0	Call
White Knight	75
WordPerfect 2.03	265
Write Now 3.0	111

JetInc. Inkjet Refill

Black Twin Pack\$15.99	
Refill unit for HP DeskWriter or Apple StyleWriter inkjet printers	
Colors Available in Red, Blue & Green	

HOW TO ORDER Payment: Visa, Mastercard, Discover (no surcharge), checks, and COD's. \$6,000 maximum on COD's **Tax:** Texas residents add 8% sales tax. **Prices** and items subject to change and availability. **International:** 5% surcharge on international orders. **Mail In:** Orders accepted with a \$10 surcharge. **Terms:** You are not charged until your order is shipped. Phone charges cannot be refunded. **Shipping:** minimum \$5-UPS Ground, Blue, Red, Federal Express. **Returns** must be in original condition and package and require an RMA= Seal must not be opened on software. Returns may be subject to a restocking fee. Ask for details when ordering. Bottom Line Distribution cannot be responsible for errors in typography or photography.



BOTTOM LINE
DISTRIBUTION

Fax: 1-900-420-8770

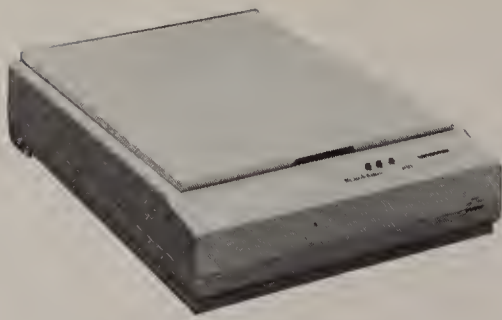
1219 West Sixth • Austin, Texas 78703

\$10 PER FAX

1-900-420-3636

\$2 PER MINUTE

LOWEST PRICES HERE



Microtek 600 ZS
\$1229

Microtek Truelaser
\$1299

SYSTEMS

Mac LC II 4/40	Price	1429
Mac IICI - 5 meg	2599	
Mac IICI - 5/105 (Quantum)	2995	
Mac IISI - 3/40	1895	
Mac IISI - 5/80	2349	
Extended Keyboard	170	
Mac Quadra 700 - 4 meg	4195	
Mac Quadra 700 - 4/105	4599	
Mac Quadra 700 - 4/210	4995	
Mac Quadra 950 - 8 meg	5395	
Mac Quadra 950 - 8/210	5995	
Mac Powerbook 140 4/40	2439	
Mac Powerbook 170	Best Price	

MONITORS

IDEK	
15" SVGA Color Display	595
17" Autoscans SVGA Color	995
21" Autoscans SVGA Color	1795
21" Autoscans 80 KHz Color	2495

Radius	
19" Precision Color Display	2290
21" Color Display	2795
Color Pivot	1249
Color Pivot Interface	515

II, LC, IISI, SE, SE/30	
Pivot Display for Built-in Video	799
Two Page Display 19"	959
Two Page Display 21"	1230
Two Page Display Interface	399
SE, SE/30, II, IISI	
Precision 8 interface	515
Precision 24x	1689
Precision 8x	779
Rocket Accelerator 25 Mhz	1700
Rocket Accelerator 33 Mhz	2195

Apple	
Apple 13" Highres	649
Seiko	
Seiko CM-1445	569
Sony	
Sony 14" Trinitron	599
SuperMac	
Platinum 19" Display	964

MONITORS (cont.)

Platinum Two-Page Display	Price	1175
Super Match 19" Color	1929	
Super Match 21"		
Two-Page Color Display	2839	
Dual-Mode Trinitron 19"	2599	
Thunder/8	1159	
Thunder/24	2699	
Spectrum 8.24 PDQ	899	
Magnavox		
14" Color Monitor	499	

DRIVES

	Ext.	Int.
Quantum 105 Pro	469	369
Quantum 210 Pro	835	710
Quantum 240 Pro	909	789
Maxtor 120	489	369
Maxtor 213	729	609
Maxtor 340	1229	1099
Maxtor 180 meg	1800	1679
Seagate 1.2 gigabyte	2269	2149
Syquest 44MB	499	
Syquest 88MB	859	
Internal Drive Kit		29
Syquest 44MB cart.		75
Road Runner 80 meg		
for Powerbook	469	
Fujitsu 425 meg 5 yr. warranty	1200	

SOFTWARE

Microsoft Word	289
Microsoft Excell	309
Aldus Pagemaker	497
Caere Omnipage	499
Adobe Photoshop 2.0	515
Quark Express 3.0	579

PRINTERS

Microtek TrueLaser	1299
TI Microlaser PS35	1495
TI Microlaser PS17	1175
QMS PS410	1475
NEC Model 95	1399
Apple Stylewriter	340
Apple Laserwriter IIx	2695
Apple Laserwriter IIg	3419
HP Deskwriter	389

PRINTERS (cont.)

HP Deskwriter Color	669
HP IIp for Mac	1539
HP IIIp for Mac	1749
HP III for Mac	2379
HP IISI for Mac	4639
HP Deskwriter Ink Cartridge	18
Appletalk Connectors	25
Color Printers	
NEC PS 40	4795

SCANNERS

Logitech ScanMan 32	279
Microtek 600ZS w/Photoshop	1229
Microtek 1850S Slide Scanner	1495
Umax UC-630 w/Photoshop	1195
Caere Typist	439

MODEMS

Zoom	
FX9624 Plus 2400 BPS	129
Modem MX 2400S w/SendFax 9600 BPS	105
v.32 Turbo w/v.42bis w/MNP software	445
Dove Fax Modem 9624	259
Dove Fax Modem 0624 Plus With Voicemail	329
PSI for Powerbook 140 & 170 internal 9600/2400	229

ACCELERATORS

Daystar	
40 Mhz PowerCache	889
50 Mhz PowerCache	1329
50 Mhz PowerCache w/68882	1599
Radius Rocket	1700

MEMORY

1 meg for LC/CI/SI	37
4 meg for LC/CI/SI	139
Powerbook 140 & 170 4 meg	299
Powerbook 140 & 170 6 meg	395
Envivio Powerbook Display Adapter and memory	Call

Printer Connection

(714) 758-8832

FAX (714) 635-1752

Overnight and Federal Express Shipping Available

Billboard Advertisers Index

Peripherals MacOutlet 800.622.6885 278	Games Amtex Software 613.967.7900 281
Accelerators Extreme Systems 800.995.2334 279	Astrology Time Cycles Research 203.444.6641 281
Accelerators Athena Computers 800.580.9269 279	Personal Finance Te Corporation 603.726.7177 281
Peripherals Pilot Technologies 800.682.4987 279	Training Expert Advisor Video 800.999.1766 282
Memory Upgrade Add On America 800.292.7771 280	Communications SoftArc, Inc. 416.299.4723 282
Systems/Parts Shreve Systems 800.227.3971 280	Utilities DGR Technologies 800.235.9748 282
Computer Systems Mac Professional 818.719.0007 280	Utilities MIFP Development 800.697.6437 283
Input Devices Sophisticated Circuits 800.827.4669 280	Furniture Agio Designs 800.688.2446 283
CAD/CAM Douglas Electronics 510.483.8770 281	CD-ROM Macworld CD Ventures 800.845.1924 283
Displays Panelite 800.726.3599 281	

Catalog Product Index

Hardware

Bar Code	284
Computer Systems.....	284
Memory Upgrade	288
Peripheral Outlet	289
Memory Direct.....	290
The LLB Co.	291
Peripherals	292
Relax Technology	292

Software

Accounting	293
Bar Code	293
Business	294
CAD/CAM	294
Clip Art	294
Communications	295
Cooking	295
Desktop Publishing	295
Educational	295
Engineering	295
Fonts	295
Genealogy	295
Graphics Translators	296
Human Resources	296
Hyper Card Stacks.....	296

Import/Export	296
Languages	296
Legal	296
Medical	297
Multimedia	297
Music/Midi	297
Public Domain	297
Real Estate	298
Religion	298
Sales/Marketing	298
Scientific	298
Sign Making	298
Specialized Fonts	298

Services

Computer Insurance	299
Computer Repair	299
Data Conversion	299
Data Recovery	299
Laser Recharge.....	299
Slides	299

Accessories

Cases	300
Covers	300
Diskettes	300
Supplies	300

MW Shopper Advertising Sales Staff


Carol Johnstone
Account Manager, MW Shopper
415.978.3152

Shannon Smith
Account Manager, MW Shopper
415.974.7414

Niki Stranz
Account Manager, MW Shopper
415.978.3105

800.888.8622

Peripherals

 **800-622-6885**

Putting Power On Your Desktop

SPECIALS!!

DAYSTAR
DIGITAL

Universal PowerCache
50MHz w/68882

\$1295

Factory Fresh. Daystar Three-Year Warranty

RasterOps

NEW !!! RasterOps PaintBoard LI

24 bit video board with acceleration for 19"

\$CALL.

NEW !!! RasterOps PaintBoard 24 System

20" RasterOps Trinitron with 24 bit accelerated video board

\$CALL.

NEW !!! RasterOps MediaTime

24 bit board w/ real time digital video and 16 bit digital audio.

\$CALL.

NEW !!! RasterOps 16" Color Monitor

IN STOCK.

RasterOps 24STV Board/accelerator

\$CALL.

RasterOps NEW 24XLI 2075 System

\$CALL.

RasterOps 8XL 1960H System

\$CALL.

RasterOps 264 30/24SX

\$CALL.

RasterOps 21" Mono System

\$CALL.

RasterOps Video Expander II

\$CALL.

DayStar Digital

Universal PowerCache 33MHz

\$579.

Universal PowerCache 40MHz

\$795.

Universal PowerCache 40MHz w/68882

\$999.

Universal PowerCache 50MHz

\$1195.

Fusion Data Systems

TokaMac CI

\$CALL

25 MHz 68040 POS based Accelerator for Mac II ci.

TokaMac LC 25 MHz 68040 Accelerator for Mac LC.

\$CALL

Truevision

NuVista NTSC Graphics Overlay Card

\$CALL.

SuperMac

Spectrum 24 Series III/Trinitron System

24 bit accelerated card with SuperMatch 20 Dual Mode Trinitron

\$3599.

Spectrum 8-24 PDQ SuperMatch 20" Sys.

Accelerated video card with 20" SuperMatch

\$2499.

SuperMatch 17" Multimode Color Monitor

\$1049.

Spectrum 8-24 / 8-24 PDQsi

\$799.

Spectrum 8LC

\$499.

All SuperMac products in stock.

Call us about our special board trade-in program.

Call for special education allowance.

NEC

NEW 4FG 15" MultiSync Monitor

IN STOCK.

NEW 3FGX 15" MultiSync Monitor

IN STOCK.

NEW 5FG 17" MultiSync Monitor

IN STOCK.

Lapis

SE, SE/30 & Mac II Display Cards

\$CALL.

Umax

UC630 600dpi Color Scanner

\$1240.

w/Photoshop (full version)

Transparency/Slide Scanner Option

\$CALL.

Automatic Document Feeder

\$CALL.

FWB Hammer

Pocket Hammer Transportable 50/100mb

\$CALL.

Pocket Hammer Transportable 200/425mb

\$CALL.

Hammer Disk 44mb Syquest removable

\$CALL.

Magnavox

Magnavox Profesional 14" Color Monitor

\$419.

TOLL FREE LINE FOR BOTH ORDERS

AND TECHNICAL SUPPORT

THREE-YEAR WARRANTY ON ALL

RASTEROPS SUPERMAC AND

DAYSTAR

BEST TECHNICAL SUPPORT AVAILABLE

30 DAY MONEY BACK GUARANTEE

Supra- IN STOCK!!

Supra 2400 w/MacPac Software

\$129.

SupraFax Modem Plus 2400/9600

\$189.

SupraFax Modem 14.4 v.32 bis IN STOCK

\$399.

E-Machines

E-Machines NEW! T-16 II/SX-24 Trin. Sys.

16" Trinitron w/24 bit accelerated video board.

\$1799.

E-Machines NEW! T-16 II/SX-8 Trin. Sys.

16" Trinitron w/8 bit accelerated video board. It's upgradable.

\$1649.

E-Machines NEW! T-16 II/DoubleColor Sys.

16" Trinitron w/8 bit accelerated video board. Incredible Value!

\$1499.

Seiko

CM1445 24 Bit Color Bundle

14" RGB monitor with RasterOps 24SX 24 bit color board.

\$1229.

CM1445 8 Bit Color Bundle

14" RGB monitor with RasterOps CB208 color board.

\$779.

TechWorks

NuBus 10 Base T, Ethernet Card

\$175.

NuBus 10 T, Thin, AAUI Ethernet Card

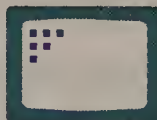
\$199.

GraceLAN Std. 50 User Version 2.0

\$329.

GraceLAN Asset Manager

\$559.



MacOutlet
GRAPHICS DISPLAY SYSTEMS SPECIALISTS

48860 Milmont Drive #103C

Fremont, CA 94538

(510) 623-8890 Fax (510) 623-8894

Circle 575 on reader service card

For your ad to appear in The Macworld Shopper, please call **800.888.8622**

PUSH YOUR MAC TO THE EXTREME

The competition claims nobody's faster - We'll guarantee it!!

EXTENDER™ A low cost way to extend the power of your LC past the LCII!! Run System 7's virtual memory. Features a 16MHz 68030. Buy today, and you can upgrade to the faster IMPACT accelerators.

For more EXTREME speed & power, all boards are available with optional 68882 math chip. Easy installation, no adapters required

Extreme
S-Y-S-T-E-M-S

CALL OR FAX FOR MORE INFORMATION. DEALER INQUIRIES WELCOME. MASTERCARD AND VISA ACCEPTED. PRICES ARE SUBJECT TO CHANGE. 30-DAY MONEY-BACK GUARANTEE. 1-YEAR LIMITED WARRANTY.



IMPACT™ 030 Increases the speed performance of your LC/LCII by 200-300%!! The MC68030 CPU operating at 32MHz allows full use of System 7's Virtual Memory without additional software. Also included is a 32K direct mapped external cache with write thru for increased overall performance. With IMPACT installed, the LC or LCII exceeds the performance of a Mac IIcx!!

VANDAL™ Combines an incredible performance increase for your SE with on-board support for a variety of third party single page and dual page monochrome monitors. You get the power of a fully functional MC68030 running at 33-50 MHz and 4 or 16MB of 32bit high speed memory to accelerate all your applications. With VANDAL installed, the SE exceeds the performance of the Mac IIcx!!

ENGINEERED AND MANUFACTURED IN THE USA

1-800-995-2334

EXTREME SYSTEMS
1050 INDUSTRY DR.
TUKWILA, WA 98188
(206) 575-2334
FAX: 206-575-3928
AL: EXTREME.SYS

Circle 576 on reader service card

Accelerate your LC




HighBoard LC

Triple your LC's performance! No software compatibility problems. Using the powerful Motorola 68030/882 combo running at 33Mhz, the HighBoardLC accelerates your LC beyond a CI. Price includes the FPU. Performance and Affordability, only from Athena.

Only \$699

Coprocessors for increased math speed!

LC & LC II FPU	Classic II FPU
16Mhz \$69	16Mhz \$69
33Mhz 139	33Mhz 139
	50Mhz 159



ATHENA COMPUTER
FOR THE MACINTOSH

100% Cotton T-shirt

Three-color black T-shirt \$15 or FREE with every order over \$200. Specify large or extra large.

Orders Only:
(800)580-9269

Tech: (512) 451-9269
FAX (512)451-2208

1204 Fairbanks Dr. Ste. B
Austin TX 78752


512K LC VRAM \$55

256K Quad VRAM \$45

ATHENA COMPUTER

Circle 577 on reader service card

INTRODUCING THE BOOKENDZ™ POWERBOOK™ DOCKING STATION



Model BE147 for PowerBook 140/170 - \$179.


- Eliminates Cable Confusion
- Requires No Power
- Compatible with Internal Video Cards
- Instantly Attach or Detach from Peripherals
- Uses Your Connectors & Cables
- Assembles In Minutes!

Imagine never having to fumble with connectors again! No more crawling under your desk looking for that elusive cable. No more bent or broken pins on a mismatched connector. You'll never leave your PowerBook on your desk again because it was difficult to disconnect everything. When you return, you'll reattach everything for true desktop power in seconds.

Call 800-682-4987 Today!
812/828-8002 Direct - 812/828-8808 Fax
10025 Valley View Rd., #158 Minneapolis, MN 55344

Pilot Technologies, Inc.

Patent Pending
PowerBook is a trademark of Apple Computer, Inc.



BOOKENDZ™
MAKING ENDS MEET

Circle 578 on reader service card

For your ad to appear in The Macworld Shopper, please call **800.888.8622**

Memory Upgrade

Memorable Additions

POWERBOOK MEMORY

MAC PORTABLE RAM

SIMMS & VRAM

CACHE CARD

FAX & VOICE NETWORKS

For All Macintoshes

IIci & IIsi

ADD★ON
AMERICA
A DIVISION OF ROHM CORPORATION

For instant product info via
ROBOFAX Day or Night
Call 1-800-424-3299

433 N. Mathilda Ave. Sunnyvale, CA 94086
Phone: 1-408-746-1590
Fax: 1-408-746-1593

1 ~ 800 ~ 292 ~ 7771

Systems/Parts

MACS AND PARTS!

Our quality pre-owned systems and "equivalent-to-new" parts offer a substantial savings over the cost of new! All units include warranty! • Ask us about upgrades!!

This Month's Specials!

IIci to Quadra 700 Upgrade\$1999.
IIsi to Quadra 700 Upgrade2499.
8-bit video bd. (apple brand)129.
Apple Flatbed Scanner399.
800K floppy mechanism99.
LocalTalk bd for the IBM pc49.
(Everybody needs at least one!)

**We Buy
Macs!**



Shreve Systems

3804 Karen Dr.
Bossier City, LA 71112

800-227-3971

fax 318.742.2799
tech support 318.742.0546

Circle 580 on reader service card

Computer Systems

Circle 579 on reader service card

MACPROFESSIONAL

(818) 719-0007

We guarantee
best pricing.

FAX (818) 719-9115

Power Book 140 4/40 .. \$1977	Laser Writer LS \$ 887	13" Apple Color \$ 637
Power Book 140 4/80 .. \$2177	Laser Writer NTR \$1627	14" Seiko Inst. \$ 547
Power Book 140 4/120 \$2297	Laser Writer II F \$2667	15" NEC 4FG \$ 747
Power Book 170 4/40 Call	Laser Writer II G \$3377	16" E Machine \$ 987
Power Book 170 8/80 Call	Desk Writer Color \$ 677	17" Sony 1604 \$1037
Quadra 950 8/240 \$5977	TI PS 17 \$1337	19" Super MAC \$1537
Quadra 950 8/425 \$6277	NEC Silent 2/95 \$1437	20" Radius \$2587
Quadra 700 4/120 \$4177	QMS 410 \$1377	20" Raster Ops \$2577
Quadra 700 8/240 \$4477	QMS PS 815 \$3077	21" Raster Ops \$2677
MAC II Ci 5/80 \$2877	Microtek True Laser .. \$1377	19" Grayscale \$1227
MAC II Ci 8/120 \$3077	Scanners	21" Grayscale \$1427
MAC II Si 5/80 \$2277	HP II C / II P ... \$1227 / \$737	1 Year Warranty.
MAC II Si 9/120 \$2444	Microtek 600 ZS \$1377	Please call for current prices.
MAC LC II 4/40 \$1397	Microtek 600 GS \$ 777	We sell only new products.
MAC LC II 4/80 \$1497	U MAX Color \$1197	19001 Ventura Blvd., Woodland Hills, CA 91364
Classic II 4/80 \$1377	U MAX 1200 DPI \$2997	Dealer & International orders welcome.

Circle 581 on reader service card

Input Devices

POWERPAD EXTENDS YOUR POWERBOOK'S KEYBOARD!

On the road or at your desk, PowerPad™ 10-key pad turns your PowerBook into a numeric powerhouse. Function and cursor keys at a touch. And a customizable key layout that can match the extended Mac keyboard or a traditional 10-key.

PowerPad's new desk accessory, 10Key Tape, combines the convenience of a calculator's paper tape with the ability to edit, cut & paste, print, and save. There's also an extra ADB port for adding a mouse or other device. A 24" replaceable cable. And a hard cover that opens to support the pad for easy use. It's the number cruncher's dream—PowerPad. Suggested retail price \$129. Call today, give your Mac new powers!

800-827-4669



SOPHISTICATED CIRCUITS, INC.

19017 120th Ave. NE Suite 106 Bothell, WA 98011
FAX: 206-485-7172/TEL: 206-485-7979

Circle 582 on reader service card

User Friendly!



*Great values are just
a phone call away.*

MACWORLD
MWShopper

Direct Response. Direct Results.

For your ad to appear in The Macworld Shopper, please call 800.888.8622

Cad/Cam

Electronic Design



- Schematic Capture
- Digital Simulation
- Parts Placement
- Manual Routing
- AutoRouting
- Board Manufacturing
- Photoplotting

Douglas CAD/CAM

Douglas Electronics, Inc.
2777 Alvarado Street
San Leandro, CA 94577
(510) 483-8770
FAX (510) 483-6453

Circle 583 on reader service card

Displays

Specialists in LCD Projection

BUY-LEASE-RENT



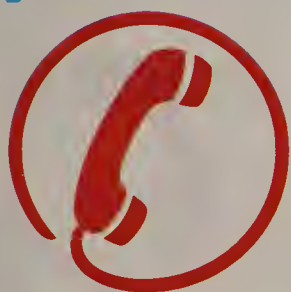
- ◆ Mac / PC / Video Projection
- ◆ Stand-alone & Overhead
- ◆ Active & Passive Matrix Panels
- ◆ Full Line of Overhead Projectors
- ◆ Full Line of Presentation Accessories

Call Now For a FREE Catalog!

Panelight 1-800-726-3599
DISPLAY SYSTEMS, INC. IN SAN FRANCISCO CALL: 415-772-5800
1040 Ferry Building, #263 San Francisco, CA 94111

Circle 584 on reader service card

Easy Access!



Great values are just
a phone call away.

MACWORLD
MWShopper

Direct Response. Direct Results.

Games

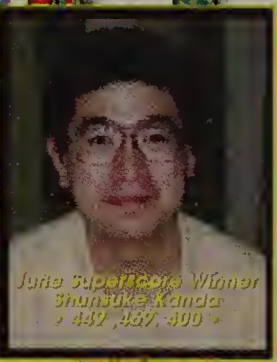
TRISTAN™ Pinball

A Digital Simulation For
The Color Macintosh.

- TRISTAN Features
- Authentic Ball Action
 - Wild Pinball Devices
 - Fabulous Sound
 - TILT and Much More!...

"Best Simulation" Finalist 1991
-Software Publishers Association

To Order:
Contact your
retailer or call
(613) 967-7900



June SuperSaver Winner
Shunsuke Kanda
447-467-000

"(TRISTAN) should be a big winner" - John Sculley

Amtex Software Corp. • 206 George St. • Belleville Ontario Canada K8N 3H4 • fax (613) 967-7902

Circle 585 on reader service card

Astrology

ASTROLOGY

For Fun Or Profit

McHoroscope

McForecast

Personal natal
charts and full 15-17
page interpretation
reports \$199.50

Amazing predictions!
Generates full,
descriptive paragraphs
\$199.50

Io Edition

An advanced program that will delight both the professional astrologer and the serious student!

\$249.50

Time Cycles Research

27 Dimmock Rd Waterford, CT 06385 (203) 444-61

Circle 586 on reader service card

Personal Finance

Are you getting all your health benefits?

macClaimCheck

The Health Insurance Tracker

- ✓ Multiple plan carry-over
- ✓ Multiple coverage/persons
- ✓ Add-on claim print modules
- ✓ Status by person, plan, or item
- ✓ Reports for claimed/unclaimed & paid/unpaid items
- ✓ Macintosh or Windows



Te Corporation
POB 140
Campton, NH 03223

(603) 726-7177 fax: (603) 726-8818

Developers of software for everyday living

\$44.99 + \$5.00 S/H

Circle 587 on reader service card

For your ad to appear in The Macworld Shopper, please call 800.888.8622

Training

Learn 4D and Director the easy way!

Learn 4th Dimension® or MacroMind Director® the easy way... on video. Get started quickly, let an expert show you how, watch an **Expert Advisor Video**. You'll appreciate seeing how Experts, like Richard Wolpert and Marcy Swenson of Afterhours Software, Frank Thompson and Dave Dell'Aquila of TriTech Systems use 4th Dimension or Art Guerrero of Art Guerrero Multimedia Lab use MacroMind Director. Eight tapes on 4th Dimension, three tapes on MacroMind Director \$59.95 each or in sets 4th Dimension Level 1 Training three tape set \$159.95, Level 2 - five tape set \$249.95, complete eight tape set \$399.95. Complete three tape MacroMind Director Set \$149.95.



EAV Expert Advisor Video

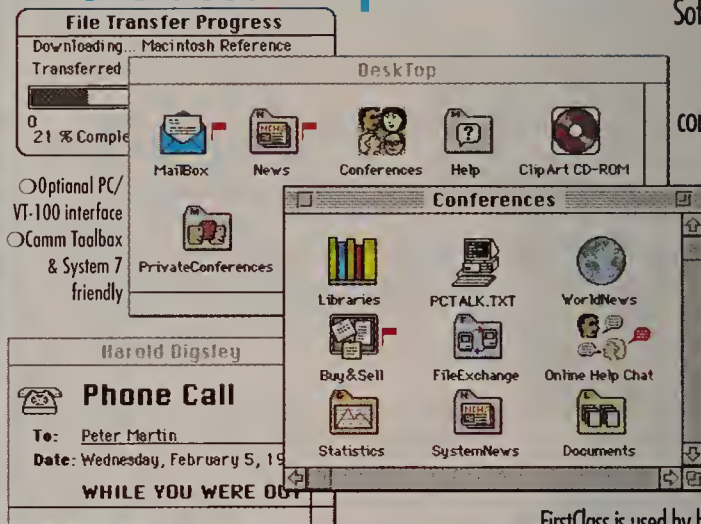
22323 Sherman Way, Building #6, Suite 200, West Hills, CA 91303
(800) 999-1766 • (818) 992-8858 • FAX (818) 704-0024



Circle 588 on reader service card

Communications

FirstClass: Corporate BBS



"FirstClass from SoftArc, Inc. is robust software with well-thought-out conferencing, E-Mail and superior file transfer. All wrapped in an exceptional user interface."

MacWeek Apr. 6, '92

- Complete graphical user interface
- Up to 20 modems per server
- Easy installation and maintenance

FirstClass is used by businesses, educators, user groups, service bureaus, governments and public bulletin board operators.

Systems start at \$295.

SoftArc, Inc.
805 Middlefield Road #102
Scarborough, Ontario CANADA M1V 2T9

Phone (416) 299-4723 Fax (416) 754-1856 Modem (416) 609-2250

Circle 589 on reader service card

Utilities

The Economical Inkjet Printer Refill.

Introducing JetInc.™ from DGR Technologies
The refill unit for your Apple StyleWriter & Hewlett Packard DeskWriter inkjet printer

Colors Available: Black, Brown, Blue, Red, & Green

Black Refill Twin Pack

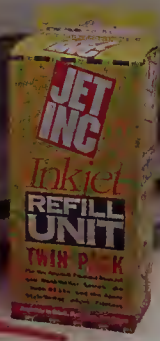
\$15.99



1-800-235-9748

Tel (512) 476-9855 • Fax (512) 476-6399

DGR Technologies • 1219 West Sixth, Suite 205 • Austin, TX 78703



Circle 590 on reader service card

Easy Access!



Great values are just a phone call away.

MACWORLD
MWShopper

Direct Response. Direct Results.

Direct Response. Direct Results.

"As the developers of PowerPad, you can imagine we watch our numbers carefully. Macworld Billboard consistently delivers the numbers we need. Billboard is a powerful way of reaching our prospects."

Amar Singh
President, Sophisticated Circuits, Inc.

MACWORLD
MWShopper

For your ad to appear in The Macworld Shopper, please call **800.888.8622**



ScreenSavor™ is the New Place to Go After Dark™!

The next time your screen goes dark, take a vacation — with ScreenSavor! ScreenSavor is a new type of accessory for After Dark. Instead of toast, ScreenSavor displays special full-color photos by some of the world's greatest photographers, including Art Wolfe, Chris Newbert, Steve Terrill, Ray Atkeson, and George Hall. Guided by its own control panel, images appear in imaginative and fanciful ways, far surpassing the "slide show" capabilities of most programs. Expand your photo collection using our ever-growing library of add-on image sets. Fly to Europe, or walk a beach. Choose from hundreds of different images, including animals, coral reefs, scenic vistas, trains, planes and much, much more. Picture relaxation or thrills, the choice is yours! So don't just save your screen, Savor it! With ScreenSavor!

Requires: Macintosh LC, II series, or Quadra computer with minimum 2.5 MB Memory and 8 or 24-bit color, System 6.07 or higher running Multifinder (or System 7), QuickTime (provided with ScreenSavor program), and After Dark™ (Trademark, Berkeley Systems, Inc.)

ScreenSavor Suggested Retail Price:
Application with Image Starter Set \$49.95
Additional Image Sets (Sold Separately) \$39.95

MIFP Development, 100A
7276 SW Beaverton-Hillsdale Hwy., Suite 187
Portland, OR 97225 (503) 292-0362



Call 1-800-697-6437 to order your copy now!

Circle 591 on reader service card

"Now The Best Mac Desk Is Tailored For You."

Introducing ergonomically crafted, fully adjustable Macintosh desks from the "Best Mac Desk" people.



FREE CATALOG!

503.690.1400 FAX 503.690.1444



a g i o
BEAVERTON, OREGON



Furniture

AS LOW AS
\$199

Circle 592 on reader service card

TRY BEFORE YOU BUY

Making the right purchase decision is always difficult; without the facts it can be impossible. Now you can "kick the tires" before you buy with *The Macworld Resource CD™*. The Resource is a high-tech consumer toolkit, with trial software, product demos and printable information from top Macintosh hardware and software companies. The Resource features:

TECH REPORT: The first QuickTime "TV Program," a 30 minute interactive show on the latest technology trends.

PRODUCTWORLD: Your interactive consumer toolkit. Get detailed product literature; run interactive demos; get "hands-on" with trial software.

THE DIRECTORY: An up-to-date, comprehensive database of thousands of Macintosh products.

If you buy Macintosh products, *The Macworld Resource CD* is a must-have. Take advantage of the charter subscription offer and save.



Special Charter Subscription

A one year Macworld Resource CD subscription (4 quarterly CDs) for only **\$49.95!**
The Fall '92 edition of The Macworld Resource CD for only **\$19.95!**

Call **800 845 1924** Today!

415/974-7474-Direct or 415/543-3984-Fax

Circle 593 on reader service card

For your ad to appear in The Macworld Shopper, please call **800.888.8622**

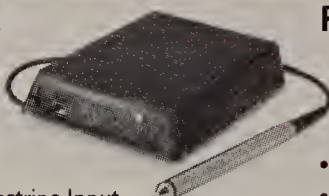
Hardware Bar Code

WORTHINGTON
DATA SOLUTIONS

BAR CODE READERS

BAR CODE READERS

- Top rated by Independent review!
- Optional Magstripe Input
- 1 or 2 scanners per reader
- Complete with Laser Scanner — \$1389
- Complete with Steel Wand — \$399



PORTABLE BAR CODE READERS

- Battery Operated Reader
- 64K or 256K Memory
- 2x16 LCD, 32 Key Keyboard
- Complete 64K Unit with Laser — \$1734
- Complete 64K Unit with Wand — \$799



- For all Macintosh models. European Keyboards Supported
- Attaches through ADB as Second Keyboard
- Wand, CCD or Laser input
- 2of5, UPC/EAN, 128, MSI, Code 39

- 2 year warranty
- Same day shipping, Free UPS Blue
- 30 day money back guarantee

"The WDP Reader is highly reliable and easy to use."
Brett Fifield, Bitstream Inc.

Call Toll Free in the USA or Canada
800-345-4220

European Office:
Rütistrasse 6
9050 Appenzell, Switzerland
71 87 51 15
71 87 51 17 Fax

USA Headquarters:
417 Ingalls Street
Santa Cruz, CA 95060
408-458-9938
408-458-9964 Fax

BAR CODE & MAGNETIC STRIPE READERS FOR MACINTOSH PLUS, SE & II

Connects on keyboard or ADB
Requires no additional program or port
Does not affect keyboard or mouse
Industrial quality, heavy-duty units
Also available
SmartCard encoder/reader
Magnetic encoder
Code 39 UPC & Printing Software
Portable Bar Code Reader

TPS Electronics
4047 Transport Street
Palo Alto, CA 94303
415-856-6833 800-526-5920
Telex: (Graphnet) 371 9097
FAX: 415-856-3843

CIRCLE 441 ON READER SERVICE CARD

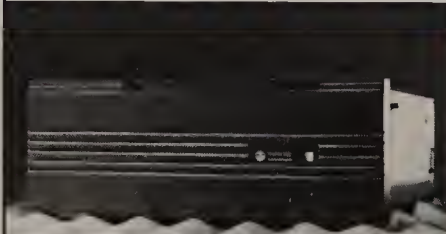
Call
800.888.8622
to reserve your space
in The MW Shopper
today!

Computer Systems

New RackMacs™

Macintosh LC and 13" RGB Monitor in one
19 inch rack-mounted NEMA 12 package.
Ideal for operator control stations.

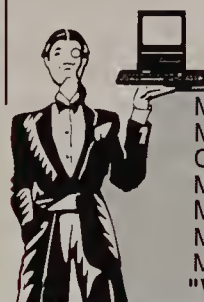
Industrial grade Mac IIx, IIcx, and now
IIci available with matching industrial
touchscreen display and rack-mounted
keyboard/mouse drawer. For vehicle, medical,
laboratory, automated test, process control
and operator entry applications.



GreenSpring Computers Inc.
1204 O'Brien Dr. Menlo Park, CA 94025
415-327-1200

CIRCLE 519 ON READER SERVICE CARD

Computer Systems



ELITE COMPUTERS & SOFTWARE, INC.

Buy • Sell • Trade • Lease • Repair • Service

"Macintosh Remarketing Specialists Since 1987"

Mac 512K / Mac Plus...\$299/399	Quadra 700 / 900....\$3699/4299
Mac SE 1-20 / SE30....699/1699	Portable / Backlit Port. 999/1299
Classic / Classic II.....894/1034	PowerBook 100 / 140..909/1724
Mac LC / Mac LC II.....984/1224	PB170 / 13" Hi-Res.....3174/5799
Mac IIsi / Mac II.....1684/1399	ImageWriter II / LQ.....249/349
Mac IIcx / Mac IIx.....1799/1899	LaserWriter / LW Plus.899/1199
Mac IIci / Mac IIcx.....2419/2999	LaserWriter IINT / NTX.1599/1899

"We'll Beat Any Dealer Price On Anything, Anywhere!!"

Phone: 408-725-1556 • Fax: 408-973-1483
ECS • Post Office Box 756 • Cupertino • CA • 95015-0756 • Hours: Mon. - Fri. 8:00-6:30 • 1 year limited warranty on all Mac CPUs. Prices are subject to change without notice. These are cash prices. Quantities are limited.

CIRCLE 493 ON READER SERVICE CARD

MacBYTE

Buy • Sell • Trade Macintosh Computers

Preowned Macs with Warranty
Cash For Your Mac or Peripheral
Low & High End Custom Setups
FAX 310-317-1583

800-432-BYTE
Open Monday - Saturday
22775 PCH, Malibu, CA 90265

CIRCLE 428 ON READER SERVICE CARD

USED

T & J ENTERPRISES

PRESENTS

After you've
called the rest...

MAC MANIA

...call us for the best
quotes in used Macs.

901/755-1314 Fax 901/757-4653

CIRCLE 421 ON READER SERVICE CARD

QUADRA

950 ▲ 950S

NEOVUE 800/880-8888

8760 RESEARCH BLVD. AUSTIN, TX. 78758

For your ad to appear in The Macworld Shopper, please call 800.888.8622

CATALOG

MACWORLD
MWShopper

Computer Systems

Computer Design & Graphic Systems™



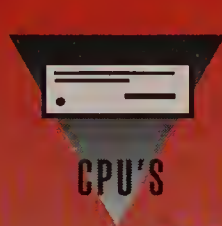
MONITORS



PRINTERS



STORAGE/MISC.



CPU'S



DISPLAY CARDS



SCANNERS



*Specialists In Graphic
System Configurations*

12734 Kenwood Center • Ft. Myers, FL. 33907

Over 2,700 products for the serious... *Graphics User!*

800 741 6227

LOCAL: 813-278-3160 • SUPPORT: 813-278-4964 • FAX: 813-278-5161

CIRCLE 406 ON READER SERVICE CARD

1-800-334-KIWI

Mac Classic II.....Call
Mac LC II 4/40mb with
14" color monitor.....\$1849
Mac LC II 4/120mb with
14" color monitor.....\$2099
Mac IISI 5/120mb with
14" color monitor and
MacPro keyboard.....\$2799
Mac IICi.....Call
PowerBook 140 & 170..Call
H.P. Deskwriter.....\$399
H.P. Deskwriter C.....\$699
External 40mb drive.....\$225
All items new. 1 year warranty.
Most items in stock today.
Visa & Mastercard No Surcharge.
C.O.D. orders accepted.

Established 1988. Better Business Bureau member.
Kiwi Computers is not affiliated with Kiwi Software Inc.

KIWI COMPUTERS

P.O. Box 67381
Los Angeles, CA 90067
US & Canada (800)334-5494
In California (310)553-4507
Fax (310)286-9667
Mon-Fri 7.30am-4.30pm PST

CIRCLE 404 ON READER SERVICE CARD

Everything for your
Macintosh, and more!
The MW Shopper

ESTABLISHED 1981

MACINTOSH CPU'S

SE 1/40.....	CALL	IICX 5/120.....	2395.
CLASSIC II....	CALL	IICi 4/40.....	2648.
LC II 4/40.....	CALL	IICi 4/120.....	2898.
LC II 4/80.....	CALL	IICi 8/240.....	3448.
IISI 3/40.....	1988.	IICi 16/420.....	4388.
IISI 5/120.....	2388.	IIFX 4/240.....	4298.

QUADRA'S

700 20/520....	5488.	100 4/40.....	1095.
950 8/520....	6795.	140 4/40.....	2395.
950 32/520..	7388.	170 4/40.....	3395.
950 64/520..	8195.	170 8/80.....	4075.

UMAX

600 DP	1268.	19" Trin.+24Xli	4595.
1200 DPI	3295.	20" Trin.+24Xli	4150.
Transparanci	769.	21" Trin.+24Xli	4695.

SUPERMAC

19"+ 8Bit	2475.	Trinitron Multi freq.	CALL
19"+ 24Bit	3345.	20"trin.+8Bit ...	2488.
20"+24PDQ	3145.	20"trin.+24Bit ...	2988.

APPLE PRINTERS

LSRWTR NTR...	1675.	ColorScript 100.	4795.
LSRWTR IIF....	2675.	PS-815MR.....	4095.
LSRWTR IIG....	3385.	PS-815.....	2995.
StyleWriter....	329.	PS-410.....	1295.

MICROTEK

True Laser 300..	1345.	PS-630.....	2648.
600ZS Colorscaner	1285.	PS-840.....	3575.
1850S Slidescaner	1495.	1200dpi11x17....	CALL

SHARP

JX-320.....	1445.	SONY 14" Trini.	569.
JX-450.....	4450.	SONY 16" Trini.	1195.
JX-600.....	8895.	E-Machine T16..	1195.

WACOM TABLET

12X12 Electrostatic	745.	Color Printers...	CALL
12x18 Standard	1145.	14" Trinitron	578.

*Quadramatics 20" Trinitron monitor with
24Bit Acc.,Pan,Zoom & Virtual Mem.\$2999.

DEALERS AND INTERNATIONAL SALES WELCOME.
Best Prices, Service, Delivery! Call or fax for best quotes

DATA COMPUTER CENTER

TEL: (310) 398-3300
FAX: (310) 391-2488
3847 Grand View Blvd. LA, CA 90066

CIRCLE 508 ON READER SERVICE CARD

TOP QUALITY PRODUCTS TOP QUALITY SERVICE

SYSTEMS

Clasic II 4-40	1245
LC II 4-40	1440
Mac II Ci 5-120	2899
Mac II Ci 8-420	3745
Mac II Si 3-80/5-120	2089/2269
Quadra 700 4-425	4799
Quadra 700 4-120	4199
Quadra 950 In Stock	Call
Powerbook 140 4-40	1989
Powerbook 170 4-40	3445
Powerbook 170 2-80	3549

MONITORS

Radius 21" Color	2889
Radius Pivot Color	1249
Radius Precision 8xCARD	729
Radius Precision 24xCARD	1645
Gen-Sys 20" Trit.+24 Bit	2895
Gen-Sys 20" Trit.+8 Bit	2399
Gen-Sys 20" Hiti.+24 Bit	2349
Sony Trit. 1304/1604	599/1059

PRINTERS

Appl. IIF/IIG/NTR ..	2699/Best/1685
Nec Silentwr. 95	1445
QMS 410	1475
QMS 815/815MR	2689/3699
NewGen PS-630/840 ..	2499/3499

SCANNERS

UMAX UC 630	1289
Microtech 600Z/1850S ..	1369/1799

TABLETS

Wacom12x12/12x18	799/1149
Calcomp 12x12/12x18	449/845

WE SUPPLY TO INTERNASTIONAL & DEALERS

COMPUTER POWER HOUSE

Tel (310) 474-6636 • FAX (310) 474-4665
FOR
ORDERS
ONLY 1-800-875-POWER
1880 Westwood Blvd., LA, CA 90025

CIRCLE 423 ON READER SERVICE CARD

COMPUTER REVELATIONS INC.

1461 Lakeland Ave
Suite 5

Bohemia, NY 11716

*We Pride Ourselves On Customer
Satisfaction*

LCII 4/40 4/80.....\$1399/1649
SI 3/40 5/80.....\$1999/2289
II CI 5/120 8/520..\$2999/3999
Quadra 700 4/120.....\$4499
Quadra 950.....CALL

1-800-275-9924

Phone 516-244-8590

Fax 516-244-8594

Memory Upgrades.....CALL
StyleWriter.....\$349
Personal LS/NT.....\$929/1399
Personal NTR.....\$1649
HP Deskwriter/Color..\$395/699
Laserwriter IIF/IIG..\$2749/3459
Powerbook 140 4/80.....\$2739
Powerbook 140 4/40....\$CALL
Powerbook 170 4/40.....\$3699
Powerbook 170 8/80.....\$4299
HP Scanjet IIP/IIC...\$899/1395
Apple 13" RGB.....\$659
Sigma-Design portrait....\$799

NEW AND USED BOUGHT AND SOLD

We also offer
E-MACHINE,GCC,RADIUS
SONY,MAGNAVOX,QUANTUM,
QMS,NEC,SIGMA-DESIGN

CIRCLE 474 ON READER SERVICE CARD

Continued...

For your ad to appear in The Macworld Shopper, please call **800.888.8622**

Computer Systems

Mac

S · A · L · E
INTERNATIONAL
New Jersey

Call for
Monthly
Specials

We also offer

TI
H.P.
NEC
QMS

SONY
RADIUS
SyQuest
RasterOps

DAYSTAR
QUANTUM
SUPERMAC
E-MACHINES

HARRIS LABS - "PERFORMER"
GCC TECH
MASS MICRO
APPLIED ENG.

Entire Macintosh Line
New and Used, Bought and Sold

Latest models in stock!

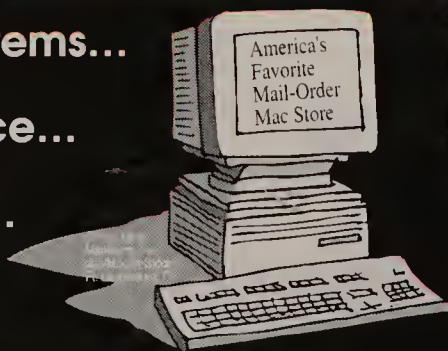
1-800-729-7031

Compare Our Prices, Quality & Service.

We'll pay cash for your Macintosh Equipment.

CIRCLE 401 ON READER SERVICE CARD

- Mac Systems...
- Expert Assistance...
- Toll-Free Support...
- Free Warranty Repair...
- Rock-Bottom Prices...



Mac-In-Stock®
800-944-6227

Fax: 305/321-0905 • Reseller Fax: 305/321-9818 • Int'l: 305/321-0904

MasterCard, VISA & American Express Welcome. Cash Discounts.

*Mac-In-Stock is a registered trademark of Hirel Marketing, Inc. All other names are products, service marks, trademarks or registered trademarks of their respective owners.

CIRCLE 457 ON READER SERVICE CARD

#1

Best Mac Buys

When it comes to used Mac's, we're the best. As the Nation's largest buying force, we stock over \$1 million in used Mac's, unmatched anywhere and at the lowest prices around. When we say refurbished, that's exactly what we mean, not wipe and send. Our quality control department assures you the best machine available for the money—or your money back—*guaranteed*.

**For Free Catalog
Call Anytime**

1-800-821-3221

Box 4059-Logan, UT 84323-4059, Fax: 801/755-3311



CIRCLE 424 ON READER SERVICE CARD

CRA

700 So. University Park Drive
Suite 350
Waco, TX 76706
1 (800) 375-9000

**We Buy and Sell New and
Used Systems Any Quantity**

Phone 817-754-2120 / FAX 817-754-2345

New Macintosh CPU's (LC, Si, Ci, Fx, Quadra 700, 900 & 950, Powerbook 100, 140, 170)
Used & Demo Macintosh CPU's (SE, SE30, Portable, II, Cx, X, Ci, Fx)

CLEARANCE SPECIALS

Apple LaserWriter IIxt, Ntx, IIfx, IIg	Call	FastPath 4 Ethernet Router NEW	\$1199
Mitsubishi G370-10U Color 300dpi		Howtek Scanmaster III w/Trans Opt. NEW	\$1399
w/Freedom of the Press Postscript driver	\$3999	IIP Scan-Jet 400dpi 16GS DEMO	\$899
QMS Colorscript 100-10 DEMO	\$5500	Laserwriter Plus Upgrade Roms NEW	\$399
QMS PS Jet Plus 8ppm Postscript Laser	\$1799	Maxtor 650 meg SCSI NEW	\$1499
Supermac 19" Color New & Used	\$1999	Mirus & Agfa Film Recorders	Call
E-Machines Color Page 15" w/8 Bit	\$1100	Wren Hard Drive Blowout	\$Cali
Mitsubishi 16" 1024 X 768 w/8bit	\$1599	Mac IIx 5/40	\$2399
RasterOps Trinitron, 8 & 32bit	From \$2299	Mac II w/040 Accelerator	\$3499
Sony 1908 Industrial Trinitron NEW	\$2699	Adobe Type Manager	\$54
Sony 19" Trinitron DEMO	\$1999	DiskFit v.1.5	\$45
600 X 600 DPI Postscript Laser	\$2499	MacDraw II (w/free Pro Upgrade)	\$279

CIRCLE 467 ON READER SERVICE CARD

For your ad to appear in The Macworld Shopper, please call 800.888.8622

Computer Systems

MACMARKET

All systems bench tested before shipping
•Toll free technical support
•Repairs and replacements are handled via
Federal Express at our cost
•Free Shipping in California

**We only sell new systems
with a full one year warranty**

•Visa, MC & Discover add 2%
•You are not charged until your order is shipped
•Prices are subject to change without notice

818•708•6388 (California)

FAX: 818•708•6399

800-223-4-MAC

PowerBook

140 4/40 .. \$1995
140 8/80 .. \$2495
140 8/120 .. \$2695
170 4/40 .. \$3395
170 8/80 .. \$3895
170 8/120 .. \$4095

Classic II

4MB/40HD .. \$1229
4MB/80HD .. \$1395
10/80 & FPU .. \$1695

Mac LCII

4MB/40HD .. \$1395
6MB/80HD .. \$1595
10/120 .. \$2025

Mac IISI

3MB/40HD .. \$1895
5MB/80HD .. \$2275
9MB/120HD .. \$2595

Mac IICI

8MB/120HD .. \$3180
8MB/240HD .. \$3445
20MB/425HD .. \$4195

Quadra 700

8MB/120HD .. \$4335
8MB/240HD .. \$4645
20MB/325HD .. \$5195
20MB/425HD .. \$5455

Quadra 950

8MB/120HD .. \$5895
8MB/240HD .. \$6245
20MB/325HD .. \$6745
32MB/425HD .. \$7195
64MB/1gbHD .. \$8875

Apple Monitor

12" Color .. \$409
13" Color .. \$649
16" Color .. \$1195

SuperMac

Spec 8 ser III .. \$515
Spec 8.24 pdq .. \$828
Spectrum 24 .. \$729
Spec 24 ser III .. \$1159
Spec 24 pdq .. \$1858
21" TPD Mntr .. \$995
20" Color .. \$1550
20T Color .. \$call

Radius

Precision 8x .. \$729
Precision 24x .. \$1655
Pivot Mono .. \$686
Pivot Color .. \$1235
Precision 20" .. \$2695

E-Machine

SX/MX .. 489/799
E 16 Monitor .. 989
T16 II Monitor .. 1295

Apple Printers

StyleWriter .. \$345
Personal NT .. \$1325
Laser NTR .. \$1679
Laser IIF .. \$2495
Laser IIG .. \$3245

HP Printers

DeskWriter .. \$395
DeskWriter C .. \$615

Microtek

TrueLaser .. \$1295
600zs Scan .. \$1295
1850s Scan .. \$1525

PLI Infinity

40 MB w/cart. .. \$549
88 MB w/cart. .. \$679
Optical 128MB .. \$1499

Sony Monitors

1320 Color .. \$385
1304 HG Color .. \$629

NEC

3FGx Monitor .. \$665
4 FG Monitor .. \$785
Silentwriter 95 .. 1425
CDR-37M .. \$449
CDR-74M .. \$599

Texas

Instrument

PS17, 2.5MB .. \$1395
PS35, 2.5MB .. \$1675
Turbo, 2.5MB .. \$1945

UMAX

UC 630 .. \$1229
UC 1200s .. \$3249

Asante

10BaseT Hub .. \$249
64K Ether .. \$219
EN/SC 10BT .. \$249
EN/SC P BOOK .. \$349

Wacom

12x12 SP-300 .. \$745
12x18 SP-300 .. \$1079

Keyboards

Apple Std .. \$92
Apple Extend .. \$165
Keytronic Pro .. \$119

PowerBook Misc

PSI 24/96 .. \$219
Global 96/96 .. \$519
Battery .. \$82
Recharger .. \$139
Envisio 4MB .. \$1195
HDI-30 Cable .. \$39
Case .. \$79

CIRCLE 420 ON READER SERVICE CARD

WANTED-USED MAC's

WE BUY YOUR USED MAC EQUIPMENT FOR TOP DOLLAR, CASH! WE SELL REFURBISHED
MAC's AT DISCOUNT! CALL FOR QUOTE. **RENTEX INC.** (800) 545-2313, (617) 423-5567

CIRCLE 521 ON READER SERVICE CARD

ACCESS II

USED MAC EQUIPMENT

DON'T BUY OR SELL ANY NEW OR USED EQUIPMENT UNTIL YOU TALK TO US.
WE DEAL EXCLUSIVELY IN MACINTOSH SYSTEMS AND PERIPHERALS.

800-662-5606

26 KEEWAYDIN DRIVE, SALEM, NH 03079

CIRCLE 469 ON READER SERVICE CARD

YOU MAY NOT RECOMMEND US...

IF YOU HAVEN'T TRIED US ONMAC'S & MORE

TRY US FREE

PH: (818)785-2800

800-858-4MAC

FAX: (818)908-5334

G.T. INDUSTRIES

*FREE UPGRADES

*MAC, RASTEROP, GCC, MICROTEK, RADUIS, HP, NEC, QMS

*NEWGEN, DAYSTAR, SUPERMAC, IKEGAMI, E-MACH

*SYQUEST, ASANTE, SHARP,and more.

*HIGH INVENTORY AT ALL TIMES

*HIGH VOLUME PURCHASING

*EXPORTING AT ANY VOLUME

CIRCLE 430 ON READER SERVICE CARD

MW Shopper Ad Sales Staff

Carol Johnstone

Account Manager MW Shopper
415.978.3152

Shannon Smith

Account Manager MW Shopper
415.974.7414

Niki Stranz

Account Manager MW Shopper
415.978.3105

800.888.8622

BUYING NEW OR USED EQUIPMENT?

Call Us First! **MACS BY MERITT**

We deal in Macintosh systems, printers & peripherals. WE WILL NOT BE UNDERSOLD!

800-238-3485

IRVINE, CA

714-263-0449

CIRCLE 429 ON READER SERVICE CARD

the mac store

Best Prices In Canada Since 1989
No Customs Hassles
The Best Warranty In The Business
Same Day Repair/Replace
Satisfaction Or Money Refunded
True Mac Experts On Staff
All Major Hardware, Software
Service Contracts

(416) 496-8107  **(800) 268-7805**

CIRCLE 426 ON READER SERVICE CARD

MACWEST

1992 - MAC LEADER

CALL US LAST

☆ Powerbooks ☆ Quadra ☆ Printers

☆ IICI ☆ IISI ☆ IIFX ☆ Monitors

F U L L L I N E

(310) 470-7099

Fax: (310) 470-8099
10837 Santa Monica · LA, CA 90025

CIRCLE 458 ON READER SERVICE CARD

Continued...

For your ad to appear in The Macworld Shopper, please call 800.888.8622

Computer Systems

**CALL US LAST WITH
YOUR BEST QUOTE!**
IN BUSINESS SINCE 1983

CLASSIC II 2/40,4/80...\$1095/1350
LC 4/80,120\$1595/1750
SI 3/40,80 MB HD.....\$1850/2075
SI 5/120,240 MB HD ..\$2290/2650
CI 5/0,40 MB HD.....\$2550/2680
CI 5/80, 120,340...\$2850/2940/3495
QUADRA 700 4/0,100...\$3775/3995
Q 700 4/160,340.....\$4350/4695
Q 900 4/0,200.....\$3995/4695
Q 900 16/425,64/640....\$5795/6995
SY QUEST 44MB Removable...\$525

MONITORS & CARDS

4/8 /16MB F/MAC\$139/280/520
POWERBOOK 100 2/20,40\$1095/1195
P.B. 140 2/20,40.....\$1895/1995
P.B. 140 2/80,120.....\$1875/1975
P.B. 170 2/20,40.....\$3200/3395
P.B. 170 2/80,120.....\$3570/3620
20/40MBHD F/POWERBOOK 195/295
80/120MB HD f/P.B.....\$450/525
2/4/6 MB MEM. f/P.B. \$150/220/310
QUADRA 950 IN STOCK. CALL!

RADIUS PIVOT/CLR...\$730/1225
RADIUS COLOR 21".....\$2750
ROCKET ACCELATOR

351/0244/0330...\$1195/1550/1995
SUPERMATCH 21" COLOR\$2795
TUNDR 24 COLORCARD.\$3195
E-MACHINE T16/E16\$1295/1120
FUTRA MX/SX/EX.\$1395/895/595
HITACHI 20" COLOR.....\$1550
SONY1304/1604/1936\$565/989/2222
APPLE 12"/13"/16"....\$425/659/1250
SUPERMAC 19"/20".....\$595/995

PRINTERS & SCANNERS

APPLE LASER IIF/IIG.\$2495/2995
APPLE LASER NTR.....\$1685
HP.DESKWRITER/CLR..\$395/645
HP.SCANJET IIP/IIC....\$750/1195
UMAX UC-630 (W/ADOBE)\$1180
MICRO TEK 600ZS.....\$1280

DEMOS & PARTS

IICX/IIX/I1 4/0....\$1890/1890/1195
MAC SE/SE-30.....\$650/1450
IINT/NTX/IIG.....\$450/895/1795

WE BUY EXCESS INVENTORY
OF:IBM,COMPAQ,APPLE F/\$\$
DEALERS CALL F/PRICE LIST

COMPU-D 6741A IN ALYS BL
1 IN ALYS, C 191405
AMEN/VISA/MC ACCEPTED
TEL: (818) 787-3282
FAX: (818) 787-2111
1-800-536-9999

CIRCLE 434 ON READER SERVICE CARD

RADIUS COLOR 21" WITH ACCELERATED 24BIT \$2799

CLASSIC 4/40\$999
CLASSIC II 4/40\$1199
CLASSIC II 4/80\$1359
CLASSIC II 4/200\$1699
LC II 4/40\$1389
LC II 4/80\$1519
LC II 4/200\$1869
SI 3/40\$1939
SI 5/120\$2239
SI 5/200\$2449
II CI 5/80\$2849
II CI 5/120\$2919
II CI 5/200\$3149
QUADRA 700 4/200\$4449
QUADRA 950 8/200CALL
Powerbook 140 2/80\$2049
Powerbook 140 2/120\$2299
Powerbook 170 4/80\$3649
Powerbook 170 4/120\$3849
NEW LASERWRITER NTR . \$1649
Laser Writer II F /IIG .. CALL US!
Style Writer\$325
Apple One Scanner\$999
*Apple Original 40MB\$139
*Apple Original 80mb\$299
*Apple Original Cache\$49

Radius Full Page Mono\$569
Radius Pivot Mono\$669
Radius Pivot Color LE w/INT\$899
Radius Pivot Color\$1210
Radius 19" Mono Display ...\$899
Radius 21" Mono Display . \$1129
Radius Precision 19" Disp. \$1699
Radius Precision 20" Disp. \$2499
Radius Precision 21" Disp. \$2399
Radius 24 Bit for 13" Monitor\$349
Radius 24XP\$519
Radius 24XK\$829
Radius Precision 24x Card ..\$969
Radius Rocket 040/33Mhz \$1899

QMS PS 410 with Toner ... \$1399
QMS 815/815MR Call for new low
QMS 860 11x17" 600dpi . prices. We won't
QMS ColorScript 10 . be Undersold!

Sony 1302/1304S \$529/\$569
Sony 1604S/1936 \$999/\$2099

Supermac Accelerator \$99
Supermac Thunder 24 \$2499
Supermac 17" Supermatch .. \$969
Supermac 19" Supermatch \$1429
Supermac 21" Supermatch \$2399

UMAX UC 630 24bit Scanner ... \$1099
EPSON ES 300 24bit Scanner \$989
MICROTEK 600ZS w/PhotoShop 2.0 .. \$1099

Magnavox 17" MULTISCAN . \$849

WE ONLY SELL NEW COMPUTERS.

Micro USA

310-473-2535

Fax us a quote 310-473-5236
2329 PURDUE AVE, LA., CA. 90064
Prices Subject to Change. NO CREDIT CARDS.

CIRCLE 427 ON READER SERVICE CARD

The Latest Macs & Hardware
Mac One
Your #1 Export Source!
320 Post Ave. Westbury, N.Y. 11590

Classic II 4/80 51599 LC II 4/40 \$1399 Quadra7* 8/105 \$4399
Powerbook 140 4/40 52549 LC II 4/80 \$1499 Quadra9* 20/425 \$6799
Powerbook 140 8/80 52899 SI 5/80 52399 Quadra9* 64/1.2 \$9299
Powerbook 170 4/40 53599 CI 5/105 \$3099 Apple 16" Trinitron 51199
Powerbook 170 8/80 53899 CI 8/210 \$3599 SuperMacThunder 24 \$2549

Wow! RasterOps /Trinitron 20"/24 bit Accelerated RGB \$2649!
• Apple • Abaton • Asante • DayStar • Dove • E-Machine • HP • Ikegami • MicroTek
• NewGeo • PLI • Quantum • QMS • Radius • RasterOps • SuperMac • SyQuest •
Texas Instrument • Wacom ... just to name a few! Please Call /Fax

CIRCLE 410 ON READER SERVICE CARD

Why Buy from Mac One? Here's Why!
• Family Owned & Operated Since 1987 • No Sales Commissions!
• Safe & Reliable Worldwide Delivery • 48 Hours to Europe!
• We Specialize in Exporting - No Hidden Costs or Extras!
• Our New York Location + Experience = Great Deals!
• We Stock what we sell, we are NOT 'Computer Brokers'.
• Foreign Orders 110/220V Our Specialty...Fax Us!
• No Sales Tax Due On Sales Outside New York State.

Great Service is EASY to Find ... Just Call Mac One!
516.997.4153 • Fax 516.997.4154
Sales Line Open: Monday-Friday 10am-5pm EDT N.Y.
Fax Line: Open 24 Hours- Fax us for weekly specials!
Terms: Cash prices shown; Visa/MC, add 3.5% or Check, Wire-Transfer, Domestic COD's OK.
All prices shown subject to drop- Call & compare for best quotes! All items NEW only!

Memory Upgrade

MEMORY DIRECT
"Don't pay retail...buy direct"

New

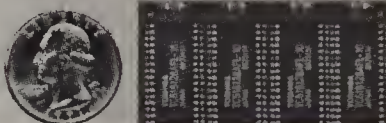
**8 MEG SIMMS
16 MEG SIMMS**

**FOR QUADRA 950
CALL NOW!**

800-486-2447

CIRCLE 524 ON READER SERVICE CARD

PB RamTM
Memory For All Powerbooks




\$Lowest per 2 MByte • 2/4/6 MByte • Upgradeable! • Gold Plated

16 MB SIMM's \$629
(for Mac IICI, IISI, IIFX, Quadras)
• 16 or 32 MB SIMM kit (4 or 8-4MB/-80 NS for the Mac IICI, CI, FI, Quad's \$449/\$898
• 8 MB kit for the Mac LC \$225
• 2 MB SIMM's for the Mac IISI, IICI, LC \$69
• 4 MB SIMM's kit for any Macintosh \$139

PortaRamTM

for the Mac Portable



\$175* per Mega-byte (1 to 8)

*Call if you find a lower upgradeable price - we'll beat it!

• One to Eight Megabyte • User Upgradeable!
• Built-in Surge Protector • Gold Plated Boards
• Uses RAM Slot - Not PDS • Very Thin 5/8" Max

Shadow Technologies
1767 Morning Glory Road
VISA Livermore, CA 94550
M/C (510) 548-0130

CIRCLE 462 ON READER SERVICE CARD

CALL NOW!

Dynamic Engineering
435 Park Dr., Ben Lomond, Ca. 95005
(P)408-336-8891 (F)408-336-3840

PowerBook

RAM, Modem, Hard Disk, Display, SW
140 & 170 6 Mb - \$299
100 6 Mb \$329
UPGRADE to 8,80/120 - \$789/\$889
PSI Power Modem \$199
SIMM 1/2/4 - \$29/57/105
MacPortable RAM LOWEST \$
M/C Visa COD P.O.

(800) 487-4655

CIRCLE 555 ON READER SERVICE CARD

For your ad to appear in The Macworld Shopper, please call 800.888.8622

CATALOG

MACWORLD
MWShopper



PERIPHERAL

SIMMs

PowerBook
Memory

Quadra
Memory

Video RAM

Cache Cards

Accelerators

SIMMs

1 Megabyte 70 ns	\$ 34.00
1 Megabyte 80 ns	31.00
1 Megabyte 100 ns	30.00
2 Megabyte 80 ns	59.00
4 Megabyte 80 ns	105.00
8 Megabyte 80 ns	319.00
16 Megabyte 80 ns	549.00

Video RAM

4 Bit to 8 Bit Upgrade	24.00
256K Quadra VRAM	39.00
512K Mac LC VRAM	59.00

LIFETIME WARRANTY
ON MEMORY
PRODUCTS

Quadra Memory

256K VRAM Quadra 700/900	\$35.00
256K VRAM Quadra 950	42.00
16 MB SIMMs Quadra 700	575.00
16 MB SIMMs Quadra 900	549.00

**PowerBook
140/170 6 MB
Upgrade**

\$289

SAME DAY SHIPPING
OVERNIGHT DELIVERY - \$ 8.00
TOLL-FREE TECHNICAL SUPPORT

800/256-6581

68882 FPU's

16 Mhz for Macintosh LC	\$ 65.00
33 Mhz for Macintosh LC	149.00
50 Mhz for Macintosh LC	199.00
20 Mhz plus 2 slots for Macintosh IIsi	119.00
20 Mhz for Macintosh Classic II	65.00
33 Mhz for Macintosh Classic II	149.00
50 Mhz for Macintosh Classic II	199.00

Cache Cards, Etc.

II si 64K Cache Card	\$ 139.00
II ci 64K Cache Card	129.00
II si 2-slot Card and 68882	119.00

PowerBook Memory

2 Megabyte Module	\$ 109.00
4 Megabyte Module	199.00
6 Megabyte Module	289.00

68030 25Mhz Accelerators

- "Quik30" for Mac SE, Plus, and 512Ke
- Runs at the speed of a Mac IIsi
- System 7/Virtual compatible
- Add up to 16 Megabytes of RAM
- Includes 68882 Math CoProcessor

only \$529.00

FPU's (chip only)

68882 16 Mhz	\$ 59.00
68882 20 Mhz	69.00
68882 25 Mhz	109.00
68882 33 Mhz	135.00
68882 50 Mhz	175.00
68881 16 Mhz	45.00
68881 20 Mhz	49.00

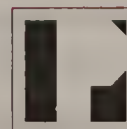
Miscellaneous

T.I. MicroLaser 1 MB	\$ 49.00
MMU for Mac LC (to run Virtual)	\$ 139.00
Mac Classic 1 MB Bd	55.00
Mac Classic 3 MB Bd	119.00
SyQuest Cartridges	65.00
512Ke to Plus Upgrade	255.00
68851 16 Mhz PMMU	79.00
Mac Portable RAM	CALL
NeXT Memory	CALL

Accelerator/Monitor Combo

- "ImagePro" for Classic, SE, Plus, 512Ke
- Runs at the speed of a Mac IIsi
- System 7/Virtual compatible
- Add up to 16 Megabytes of RAM
- Includes 68882 Math CoProcessor
- Optional Display- 15, 19, or 24 inch.

Unbelievably Fast!



PERIPHERAL OUTLET

327 East 14th, PO Box 2329
Ada, Oklahoma 74820
International ☎ 405/332-6581 FAX ☎ 405/436-2245

CIRCLE 454 ON READER SERVICE CARD

For your ad to appear in The Macworld Shopper, please call **800.888.8622**

MEMORY *DIRECT!*

"Don't pay retail...buy direct"

HARD DRIVES

	Internal	External
• Maxtor 80 Meg	\$289	\$349
• Maxtor 120 Meg	\$359	\$415
• Fujitsu	Call	Call
• Syquest Removable	—	\$459

SUPER MAC

• Thunder 8	\$1319
• Spectrum 24 PDQ	\$2049
• Thunder 24	\$2875
★ Video Spigot NuBus	\$499
★ Video Spigot si	\$419
★ Video Spigot Pro NuBus	\$1369

QUADRA SPECIALS

★ 4 Meg Sims	\$109
★ 8 Meg Sims	\$319
★ 16 Meg Sims	\$549
★ 512K VRam Kit	\$ 69

NOTEBOOK MEMORY

★ 2 Meg Card	\$109
★ 4 Meg Card	\$245
★ 6 Meg Card	\$315

SIMMS

1x8 - 80NS	\$33
1x8 - 70NS	\$35
2x8 - 80NS	\$65
2x8 - 70NS	\$69
4x8 - 80NS	\$105
4x8 - 70NS	\$109
4x8 - 80 FX/NTX	\$113
4x8 - 80 II/IIx	\$129
8x8 - 80NS	\$319
16x8 - 80NS	\$549

DAYSTAR ACCELERATORS

		w/ math chip
Power Cache 33	\$655	\$855
Power Cache 40	\$855	\$1045
Power Cache 50	\$1279	\$1545
Fast Cache si	\$289	\$362
Fast Cache ci	\$259	—

MAXIMUM MEMORY SPECIAL

16 MEG SIMMS
★ **\$509** ★

★ ★
★ ★
★ ★
★ ★
★ ★

SYQUEST CARTRIDGES

★ **44 MEG \$64** ★
★ **88 MEG \$116** ★

800-486-2447

Fax (714) 847-5043 7911 Professional • Huntington Beach, CA 92648
Prices reflect specials only. Call for complete catalog.

Corporate PO's
Government PO's
Educational PO's
Lifetime Warranty!



CIRCLE 516 ON READER SERVICE CARD

For your ad to appear in The Macworld Shopper, please call 800.888.8622

Memory Upgrade

SIMPLY THE BEST

SERVICE • QUALITY • PRICES FROM THE LLB CO.

CHECK OUR SUPER
PRICES ON SUPRAS

OPTICAL DRIVES

DGR 128 mb 3.5 Optical Drive \$1299
Virtual 128 mb 3.5 Cartridge 49
KOMAG 128 mb 3.5 Cartridge 45

MULTIMEDIA

RasterOps 24 STV Display Board \$769
Mac Speaker 169
Video Spigot NuBus with Adobe 469
Video Spigot IIsi with Adobe 379
Video Spigot LC with Adobe 399
Video Spigot Pro NuBus w/ Adobe . 1369
Video Spigot Pro IIsi with Adobe 1285
MacRecorder 239
Macromind Director 3.1 685
Adobe Premiere 304
Macromind 3D 995
Animation Works 115
Macromind Accelerator 135

FARRALLON/NETWORKING

PhoneNET Din-8 Connector \$29
PhoneNET Din-8 Connector 10-Pack ... 195
PhoneNET Star Connector 15
PhoneNET To Local Talk Adapter Cable .. 8
StarConnector 12 Port w/Mgmt 1023
StarConnector 24 Port w/Mgmt 1295
StarConnector EN Port 10BT w/Mgmt 1355
StarConnector EN RJ-45 AUI 135
StarConnector EN RJ-45 AAUI 102
Timbuktu 4.0 Single User ..127, 10-Pack680
Timbuktu /Remote 3.0 127

INK JET CARTRIDGES

DGR Technologies JetInc. **15⁹⁵**
Printer Cartridge Refill Unit.
Twin Pack Black, red or blue ink.

ASANTE/NETWORKING

Maccon+Ile MacII Thick/Thin, 16K \$169
Maccon+Ilet MacII Thick 10Base T, 16K.. 169
Maccon Thick/10 Base T 169
SCSI Ethernet Thick/Thin 10 Base T 290
SCSI Ethernet for PB, 10 Base T 290
SCSI PB Ethernet 10 Base T w/SCSI Cable 359
CALL FOR MORE ASANTE PRODUCTS!

ACCELERATORS & CACHE CARDS

Call for the lowest prices on Day Star, Applied Engineering, & Tech Works

SYQUEST CARTRIDGES

\$64 \$105
44MB 88MB

MISCELLANEOUS

AE Quadralink \$182 Optima 32/Software... .. \$149
Quadra Link DMA 329 LC 16MHz Math
Quadra Video RAM 256K.. 35 Co-processor 65
PMMU/MC6885 159 Classic II 16MHz Math
Maxima 2.0 44 Co-processor 65

SIMMS

1x8x80 **\$31** 2x8x80 **\$58** 4x8x80 **\$105**

1x8x70 \$33 4x8x80 MacIIx/II .. \$127 4x8x70FX \$109
1x8x100 30 1x8x80FX 33 8x8x80 329
4x8x70 107 1x8x70FX 34 8x8x80FX 329
4x8x100 104 4x8x80FX 107 16x8x80 529
16x8x80FX 529

MAC PORTABLE SIMMS

MP30 \$479 MP40 \$599

POWERBOOK

PB100-2MB \$109 PB140/170-4MB \$229 Automobile Adapter \$95
PB100-4MB 229 PB140/170-6MB 289 Carrying Case 75
PB100-6MB 299 Roadrunner 80mb PB140/170 External
PB140/170-2MB 109 Internal Hard Drive . 689 Battery Charger 185

MODEMS

Quicktel Xeba Send/Rec Fax Modem QT100 \$195
Quicktel Xeba Send/Rec Fax Modem QT 200 389
AE Modem, 2400 MNP5 Send Fax 119
Global Village Teleport Full Fax 214
Global Village Powerport Gold 619
Global Village Powerport Silver 439
Global Village Powerport Bronze 219
PSI Power Modem 214
NEW! Supra 5014 S/R Fax Modem V.32 bis 375
NEW! Supra 5024 2400 baud modem 74

FAX YOUR ORDER 24 HOURS A DAY
(206) 454-7302

COMPARE OUR LOW SHIPPING PRICES:

\$6 And up Overnight shipping by Airborne Express. **\$4** And up ground shipping by UPS.

- Orders received before 7:30 PM Eastern Time weekdays ship same day.
- We export to most countries in the world.
- Prices subject to change.
- Quantity pricing for dealers.
- Bank cards accepted. Your card is not charged until the order is shipped.
- All returns require approval and are subject to a restocking fee.

ALL GOVERNMENT & EDUCATIONAL PO'S ACCEPTED UPON APPROVAL

Call Between 7AM and 6PM Pacific Time
Weekdays and 9AM to 4PM Saturdays

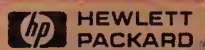
1-800-848-8967

The LLB Company, Inc. • 300-120th Ave NE, Bldg. 1,
Suite 120, Bellevue, WA 98005 • Phone: (206) 454-7258

CIRCLE 525 ON READER SERVICE CARD

For your ad to appear in The Macworld Shopper, please call 800.888.8622

Peripherals



Video Boards, Monitors and Packages

All Packages include Monitor, Video Board & Cable!

14" Color - 256 Colors - Princeton 1400	549
20" Color - 256 Colors	999
20" Ikegami C/N 20 - 256 Color	1,499
20" Trinitron - 256 Colors	1,999
20" Trinitron - 16-Million Colors	2,799

20" Trinitron

Includes 20" Trinitron, 8-Bit Relax Video Board, & Cable Complete!

\$1,999

Monitor Only \$1,799

Fantastic value! The monitor is a 20" micro-processor controlled Trinitron which self-adjusts to almost any video input. Our 256-color nabus video board and shielded cable is included - all at one low price!

We Have ESP!
(Express Service Program)

48-Hour Service Guaranteed!

20" Color

Includes 20" Monitor, 8-Bit Relax Video Board, & Cable Complete!

\$999

Monitor Only \$799

Special Purchase! We recently purchased the remaining inventory of 20" color monitors from a major US manufacturer at rock bottom prices! We have a limited supply and this is a limited time offer! Hurry before they are all gone! One-year parts and labor warranty too!



SyQuest Drives

Complete System - includes cables, carrier, and software.

Mobile 44 Vista - includes cartridge	429
44 Megabyte Data Cartridge	68
Mobile 88 Vista - includes cartridge	559
88 Megabyte Data Cartridge	109

2-Year Warranty

All drives are pretested and are warranted for 24-months. The Relax Mobile is a complete package - all cables and software are included - at no additional charge!

\$429

SyQuest 44

\$559

SyQuest 88

Call for our new **FREE Catalog!**
Over 500 items!



Service -

All products are 100% tested - if you need help, we are just a phone call away. We have over 14 years of customer service experience!

Price -

Our size allows us to purchase at the lowest possible cost, and we manufacture in our own factory. Then we pass the saving on to you.

Performance -

Serious business and professional users demand performance - our Trinitron monitors and Hewlett Packard 3-1/2" hard drives.

Selection -

We offer more than 500 different products for IBM, Macintosh and SUN. From SIMMS to 24-B Trinitron video packages we offer more of what you need. Call for our new catalog.

Quality -

We only offer quality products that you can depend on. And if for any reason you are not 100% satisfied we offer a 30-day money back guarantee - We Guarantee Your Complete Satisfaction!

OUR
14
1978
ANNIVERSARY

Hard Disk and Tape Drives

	Internal	External
Seagate 3-1/2" Half Height		
120 Meg. - ST1133N, 15 ms.	339	399
240 Meg. - ST3283N, 12 ms.	599	659
510 Meg. - ST1581N, 14 ms.	1,239	1,299
5-1/4" Full Height - WREN		
300 Meg. - ST4350N, 16.5 ms. ...	1,039	1,099
600 Meg. - ST4702N, 16.5 ms. ...	1,339	1,399
1.0 Gig. - ST41200N, 15 ms.	1,799	1,859
1.4 Gig. - ST41650N, 15 ms.	2,199	2,259
1.9 Gig. - ST42100N, 12.9 ms. ...	3,039	3,099
5-1/4" Full Height - WREN Runner		
330 Meg. - RUNNER, 10.7 ms. ...	1,299	1,359
660 Meg. - RUNNER, 11.9 ms. ...	1,599	1,659
5-1/4" Full Height - ELITE Ultra-High Performance		
1.4 Gig. - ELITE-t, 11.5 ms.	2,889	2,949
2.1 Gig. - ELITE-tl, 11 ms.	3,739	3,799
3.5 Gig. - ELITE-ttl, 11 ms.	6,239	6,299

Fujitsu 3-1/2" Half Height		
425 Meg. - 2623SA, 9 ms.	1,039	1,099
520 Meg. - 2624SA, 9 ms.	1,239	1,299
5-1/4" Full Height		
650 Meg. - 2263SA, 16 ms.	1,339	1,399
960 Meg. - 2266SA, 11.5 ms.	1,939	1,999
1.7 Gig. - 2652SA, 11.5 ms.	3,039	3,099

DAT, Exabyte & Teac Tape Drives

160 Meg. Tape Vista - TEAC	569
250 Meg. Tape Vista - Archive	599
600 Meg. Tape Vista - TEAC	779
2.0 Gig. DAT Sierra - R-Byte	1,299

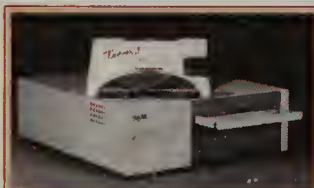
	Internal	External
Quantum 3-1/2" LPS		
50 Meg. - LPS 52, 9 ms.	229	26
105 Meg. - LPS 105, 9 ms.	359	41
120 Meg. - LPS 120, 10 ms.	429	48
240 Meg. - LPS 240, 10 ms.	669	72
2-1/2" - "Go*Drive" Series - for PowerBook only		
80 Meg. - Go*Drive 80, 16 ms. ..	439	53
3-1/2" Pro Series		
425 Meg. - Pro 425, 8 ms.	1,099	1,15

Maxtor 3-1/2" Low Profile/Low Power		
90 Meg. - LXT100S, 20 ms.	299	35
120 Meg. - 7120S, 17 ms.	399	45
5-1/4" Full Height		
645 Meg. - XT8760, 16.5 ms.	1,399	1,45
1.0 Gig. - Panther, 13 ms.	1,839	1,89
1.5 Gig. - Panther, 13 ms.	2,399	2,45

Hewlett Packard 3-1/2" Half Height		
310 Meg. - HP2234, 12.6 ms.	1,139	1,19
400 Meg. - HP2235, 12.6 ms.	1,239	1,29
1.0 Gig. - HP2247, 12.6 ms.	2,399	2,45
5-1/4" Full Height		
1.0 Gig. - HP97558, 13.5 ms.	1,979	2,03
1.3 Gig. - HP97560, 13.5 ms.	2,399	2,45

2.0 Gig. DAT Sierra - Archive	1,35
2.2 Gig. Tape Vista - Exabyte	2,04
5.0 Gig. Tape Vista - Exabyte	3,29
2.0 Gig. DAT Vista Hewlett Packard	1,39
8.0 Gig. DAT Vista Hewlett Packard	1,82

Rewritable Optical Drives



as low as...

\$1,499

600 Meg. ISO Optical



- Industry Standard - ISO Certified
- Macintosh - IBM - SUN Compatible
- Low Cost - High Performance

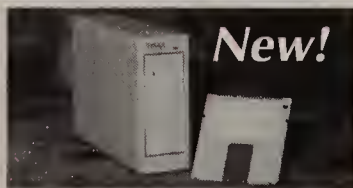
Large, fast and affordable. We offer a variety of solutions for your large capacity data storage needs. 110/220 VAC.

600 Meg. Ricoh ISO 5030E-I	1,499
While Supplies Last - Limited Quantity!	
Lowest cost per megabyte - 67 ms. average access.	

600 Meg. Optitem ISO Model 750	1,799
Premium Quality at Low Cost - 60 ms. average access.	

600 Meg. Ricoh ISO 5030E-II	2,199
Lowest cost per megabyte - 67 ms. average access.	

600 Meg. Ricoh ISO 5031E New!	2,799
High performance - 35 ms. average access.	



128 Meg. Optical

Macintosh & IBM compatible

\$1,299

Each 3-1/2" erasable optical cartridge holds over 120 megabytes of data! The Sierra MO (shown) is an ideal primary or backup storage device for IBM or Macintosh personal computers. Featuring the RICOH 3010E drive, the Sierra MO is IBM and SONY compatible - and it is faster! Complete package - includes SCSI cable, Mac software, and external power supply. Specify 110 or 220 VAC.

Includes media, software & cables!

128 Meg. ISO 3010E	1,299
128 Meg. Cartridge	49

Powerbook 140/170 - 4 Meg. Card	199
Powerbook 140/170 - 6 Meg. Card	299
Powerbook 12-Hour Battery Pack	79
All SIMMS are covered by our limited lifetime warranty!	

Newer Technology:

"fx/Overdrive" Accelerator	599
"Quadra 900/Overdrive" Accelerator	299

Asanté:

Asanté MacCon3 - All Models	219
Asanté MacCon+ - All Models	169
Asanté FriendlyNet Adapters - All Models	89
Asanté SCSI to Ethernet - All Models	349
Asanté 10BaseT Hub/8	249
Asanté 10BaseT Hub/12	499

Co-Star:

AddressWriter	495
LabelWriter II Mac	199
LabelWriter II Plus Mac	299

Miscellaneous

Modems:

SupraFAX Modem Plus 2,400	199
SupraFAX Modem v.32 9,600	279
SupraFAX Modem v.32bis 14,400	379

SIMMS, Video RAM, Accelerators:

1 Meg. - 1Mx8-100/Mac	29
1 Meg. - 1Mx8-80/Mac	32
2 Meg. - 2Mx8-80/Mac	64
4 Meg. - 4Mx8-80/Mac	119
8 Meg. - 8Mx8-80/Mac	349
16 Meg. - 16Mx8-80/Mac High Profile ..	519
Quadra- 256K Video SIMM	29
Classic- 3 Meg. Exp. Card w/1 Meg.	49
Classic Accelerator w/Co-Processor	289
Powerbook 100 - 4 Meg. Card	239
Powerbook 100 - 6 Meg. Card	349

CD-ROM Drives

SPECIAL PURCHASE! We have a limited number of the Toshiba XM3301B CD-ROM players. While this model is not quite as fast as the newer XM3301B it does have many of the same features. Hurry while supplies last!

CD-ROM - Vista - XM3301B 399

Featuring the Toshiba XM3301B Vista CD-ROM provides state-of-the-art performance including a sealed contamination free environment and an automatic lens cleaning mechanism which dramatically improves reliability. Performance is a fast 325 milliseconds average access. Full audio control via software is provided by the Music Box software (included). Includes sample CD-ROM.

CD-ROM - Vista - XM3301B 549

510-471-6112



3101 Whipple Road
Union City, CA 94587
FAX: 510-471-6267
TEL: 510-471-6112

We will **BEAT** any competitor's price for comparable product - call for details!



Call or FAX for FAST SERVICE! No surcharge for credit cards, terms available for approved accounts. Purchases accepted. We ship via Federal Express.

1992 RELAX, Sierra, Molex, and Vista are trademarks of Relax Technology, Inc. All Trademarks and Registered Trademarks are the property of their respective holders. Prices subject to change without notice. Product subject to prior sale.

CIRCLE 422 ON READER SERVICE CARD



For your ad to appear in The Macworld Shopper, please call 800.888.8622

Peripherals

Hard Drives At Wholesale Prices

This Month's Special:
PowerTech External HD's!

PT 21. (Miniscribe)	\$219
PT 50. (Seagate)	\$259
PT 65. (Seagate)	\$279
PT 85. (Seagate)	\$319
PT 105. (Quantum)	\$449
PT 120. (Quantum)	\$529
PT 210. (Maxtor)	\$549
PT 240. (Quantum)	\$799
PT 376. (Seagate)	\$899
PT 766. (Seagate)	\$1299
PT 1.2g. (Seagate)	\$1899

Drive Sales  

All items subject to availability. Prices subject to change without notice.

800-741-3668

CIRCLE 463 ON READER SERVICE CARD

Hewlett Packard				
3.5", 5 Year Warranty, SCSI-2				
		Int.	Ext.	
234 Mb	12.6 ms	\$ 739	\$ 829	
328 Mb	12.6 ms	1089	1179	
422 Mb	12.6 ms	1219	1309	
1.2 Gb	10.5 ms	2199	2289	
5.25", 5 Year Warranty, SCSI-2				
1.2 Gb	12.6 ms	1899	2009	
1.6 Gb	13.5 ms	2429	2539	
2.11 Gb	11.5 ms	3299	3409	
2.35 Gb	11.5 ms	3550	3660	

Fujitsu				
5.25", 5 Year Warranty, SCSI				
520 Mb	9 ms, 3.5"	1219	1309	
1.2 Gb	11 ms	1899	2009	
2.06 Gb	11 ms	3115	3225	

MICROPOLIS				
5.25", 5 Year Warranty, Fast SCSI-2				
765 Mb	15 ms	1299	1409	
1.2 Gb	14.5 ms	1899	2009	
2.0 Gb	14 ms	3025	3135	

ProDirect
800-524-9952
Fax: 612-935-8352
Ph: 612-935-8201
Corp. • Educ. • Gov't. P.O.'s Welcomed
Dealer Inquiries Welcomed

CIRCLE 480 ON READER SERVICE CARD

Everything for your
Macintosh, and more!
The MW Shopper

SONY	RICOH	SUPERMAC	PLI	PINNACLE MICRO
REWRITABLE MAGNETO OPTICAL STORAGE SPECIALS!  NEW! P.M.O. 650 19 msec Access!	SONY 501 600MB 5.25" OPTICAL \$2,499 • 66 msec access! • Sony 600MB cartridges as low as \$129! • 30yr Warranty on Sony cartridges!	SONY 301 128MB 3.5" OPTICAL \$1,459 • 37 msec access! • 128MB cartridges as low as \$39! • 30yr Warranty on Sony cartridges!	RICOH 9200EH 600MB 5.25" OPTICAL \$1,799 • Faster than EI Hurry Only 10 drives left!	SuperMicro 2227 Artesia Blvd #102 Redondo Bch, CA 90278 We Also Sell SW, Scanners, Monitors & Printers 1-800-352-3415
MO Cost Per MByte? 3M 600MB = \$0.198 Sony 600MB \$0.215 128MB = \$0.305	SYQUEST	MICROTEK	QMS	MICRONET
SEIKO				

CIRCLE 442 ON READER SERVICE CARD

COMPUTER REVELATIONS INC.
1461 LAKELAND AVE. SUITE #5-BOHEMIA NY 11716 FAX: 516-244-8594

NEC 3FGX \$659.00
MAGNAVOX 14" \$429.00

800-275-9924

SONY 1304 14" RADIUS PRECISION \$629.00 COLOR 19" 2099.00
SIGMA-DESIGN
POWER PORTRAIT \$799.00

CIRCLE 460 ON READER SERVICE CARD

Bar Code

BAR CODES

- Labeling Software — Bar Codes, Images, Text — Flexible Design
- Complete — Nothing Else to Buy
- Code 39, UPC/EAN and PostNet
- Not HyperCard Dependant
- Simple, Easy-to-Use, Plug & Play

WORTHINGTON DATA SOLUTIONS
417 Ingalls Street, Santa Cruz, CA 95060



* WORTHINGTON DATA *

- 42 PostScript Type 1 Fonts.
- Generate film masters from PageMaker, Illustrator, Quark, WriteNow, etc.
- \$199 includes Labeling Program and Fonts
- 30 day money back guarantee

800-345-4220 OR 408-458-9938

Software Accounting

Hot Business Sense 1.6 New

Now you don't need to be an Accountant to do your own accounting on your Mac! Business Sense Takes Integrated Accounting into the next century. Includes AP, AR, GL, PAY-ROLL, Budgets, Imports and Exports. - List price \$199 - For a FREE test drive call: **800-377-4954**

Fax **800-377-5453**

Business Sense, Inc. 6360 Moki Cr West Jordan UT 84084

CIRCLE 567 ON READER SERVICE CARD



Bar Code Fonts

"...the people at Bear Rock are flat-out experts on the topic of bar codes and produce products of exceptionally high quality." — Personal Publishing Magazine, 6/91

- Code 39 • UPC/EAN • ISBN • Interleaved 2 of 5 • POSTNET/FIM
- Compatible with almost any application • \$95-\$225
- CodeScan 3000 bar code readers • 5 year warranty • \$395

Sales
1-800-BEAROCK
916-622-4640
FAX
916-622-4775



Bear Rock TECHNOLOGIES

6069 Enterprise Drive • Diamond Springs, CA 95619

★★★★½
"This is the best product of its kind, and it's reasonably priced too."
MacUser, 6/90

Find it in
The MW Shopper

For your ad to appear in The Macworld Shopper, please call **800.888.8622**

Business

use your machintosh® to BUILD A PROFITABLE HOME BUSINESS

- * Over ten new business ideas every 90 days * Fast & low cost start-ups
- * Easy-to-use templates for spreadsheet, WP & database applications
- * Guide to invoicing, billing, marketing, inventory & financial stmts

TIPS; on credit, incorporating, taxes, and more!
\$47.25 for a 1 year membership

☆☆ AMERICAN
☆☆☆ ENTREPRISE
"BEST IDEAS & BEST
TEMPLATE DESIGN"

Call today! 1(800)775-BEAR
SunBear Technologies, Hatboro, PA

CIRCLE 447 ON READER SERVICE CARD

Proven software for growing companies

BizPlanBuilder™ \$129

Working business and marketing plan
for organizing/financing your business
— with text & spreadsheets.

EmployeeManualMaker™ \$139

Protect your relationship with employees
with this personnel handbook
(110+ policies and 30+ benefits).

Business GuardDog™ \$159

Keep employees & customers honest — shrewd
management insights for you, 77+ procedures
and memos (on diskette) for them.

LivingTrustBuilder™ \$139

Preserve your estate. Avoid probate, hassles
& taxes with this living trust package.

FREE CATALOG
(800) 346-5426
(415) 941-9191 worldwide

CIRCLE 414 ON READER SERVICE CARD

Clip Art

AdArt
Encapsulated Postscript Images

LOGOS & TRADEMARKS, VOLUMES 1 - 8
100 EPS Corporate Symbols per Vol

INT'L SYMBOLS & ICONS, 1 & 2

FLAGS OF THE WORLD

VINYL CUTTER'S COLLECTION
Compatible with Vinyl Sign Cutting Equipment

BUSINESS SYMBOLS COLLECTION

SAFETY & PACKAGING COLLECTION

RECYCLED ART

FAX 802-878-1768 • INFO: 802-879-1164
800 255-0562

Innovation Advertising & Design
41 Mansfield Ave • Essex Jct. VT 05452

MasterCard
VISA

CIRCLE 436 ON READER SERVICE CARD

Perfect Body Parts. 99¢ Each.

**MediClip... the first complete
medical anatomy and art library
for your MAC or IBM.**

- Available in high quality
EPS and all major formats
- 3 volumes of 100 images
for only \$99 each

1-800-998-8705

MediClip™

This offer not valid through retail outlets.

CIRCLE 431 ON READER SERVICE CARD

Clip Art

**New! Introducing a New Concept
in Font Format** 520 Original Images

Vol. 1 Ornaments ♦ Vol. 2 Corners
Vol. 3 Art Deco ♦ Vol. 4 Images

PolyType™
\$89.00 per vol.

Use in any program that supports font menus
Scalable to any size your program allows
Open & modify outlines in Freehand or Illustrator

Call for Free Brochure 800 998-9934
P.O. Box 25976, Los Angeles, CA 90025 FAX 310 444-7897

CIRCLE 448 ON READER SERVICE CARD

CLASSIC SERIES CLIP-ART
Original Images from the "Turn of the Century"

Borders, Corners, Bullets, Flourishes. Everything you need to accent your Documents.

Vol. 1, 2 or 3 \$49.00 each All Three Vol. \$125.00 1-800-829-8918

CIRCLE 416 ON READER SERVICE CARD

NEW! (in color!) **ARTBEATS**
Marble & Granite
40 hi-res TIFF images, 120 PICT
images, 160 seamless tiles and
floor tiles. Double CD-ROM-\$349
800-444-9392 or 503-863-4429
ARTBEATS, Box 1287, Myrtle Creek, OR 97457

CAD/CAM

**Professional
CAD Symbol Library**

Over 3,000 CAD Symbols in One All-Inclusive Package

Architectural (Residential & Commercial), Interior
Design & Site Planning, The "Plumbing & Heating
Supply House", The "Hardware Store", The "Electronics
Shack", Welding, General Drawing Aids, Cartographic,
180+ Page User's Manual, And Much More, All for
\$149.95!

Advanced System Design, Inc.
1010 Stagecoach Blvd., P.O. Box 3131
Evergreen, Colorado 80439
(303) 674-2222 to Order

Compatible with
Clarix CAD™,
MacDraw II™,
PowerDraw™ and
Canvas™

(Specify Clarix CAD, MacDraw II, PowerDraw or Canvas Version)

CIRCLE 409 ON READER SERVICE CARD

ECLECTIC
BEAUTIFUL
IRRESISTIBLE
CLASSY
ATTRACTIVE
FUNNY

All these images are
ready-to-use post-
script images for
designers, publishers,
and typographers
looking for well de-
signed graphic im-
ages. Available in Mac
and PC eps format at
\$59 per collection.
(See us at MacWorld Expo,
booth #208.)

To order with Visa or MC, call
1/800.858.5254
M-F, 9-5 central time (USA only)

[metal]

A product of Metal Studio
Inc. 13164 Memorial Dr., #222
Houston, TX 77079
713.932.6088
Fax 713.932.6087

All product names are trademarks
and property of their respective
companies. [metal] is a trademark
of Metal Studio, Inc.

CIRCLE 415 ON READER SERVICE CARD

MAPART!
Professional Quality Maps for Graphic Design
Publications • Presentations • Brochures • Slides • Teaching Aids
World • Continents • Major Countries • 25 Major US Cities
Detailed Coasts, Islands, Lakes, Rivers
Globes • US States with Counties
Available as object EPS or PICT file
Compatible with all popular DT
and Graphic Design software

"Fine Artwork"
— MACWORLD, Jan 1992

For FREE catalog
with Sample Maps
800-334-4291

MICROMAPS SOFTWARE
555 Main St. Box 757 Lambertville NJ 08530
Voice 609-397-1611 • FAX 609-397-6722

CIRCLE 417 ON READER SERVICE CARD

For your ad to
appear, call
800.888.8622

MACWORLD
MWShopper

For your ad to appear in The Macworld Shopper, please call **800.888.8622**

CATALOG

MACWORLD
MWShopper

Communications

TeleFinder™

GROUP EDITION BBS



The leading Macintosh Bulletin Board System in business and education. First in quality and performance. "The most useful BBS we've seen" *MacUser (UK)*.

- Multi-user, E-mail, ZMODEM file transfer, conferences, find file, and graphic user interface.

- Use modem or AppleTalk with NetConnect.

- Supports Mac and PC users.

- Comm Toolbox and System 7 savvy.

- TeleFinder is \$425.95 for unlimited users. Includes host and user communication software. Call for free demo!

Spider Island Software

4790 Irvine Blvd #105-347 Irvine, CA 92720

tel (714) 669-9260 fax (714) 669-1383

bbs (714) 730-5785

CIRCLE 435 ON READER SERVICE CARD

Cooking

Digital Gourmet

A Books-on-Disk® Hypercard based electronic cookbook. Contains over 1,000 traditional & contemporary recipes.

Designed to appeal to health conscious eaters; calorie, fat, carbo., sodium, & protein contents are provided for ea.

recipe & ingredient. Other features incl.

searching for, modifying, printing recipes, & adding an unlted. # of recipes.

TeleTypesetting Co. Books-On-Disk
311 Harvard Street

Brookline, MA 02146

800/800-3333 MacConnection

617/734-9700 Direct

617/734-3974 Fax

Desktop Publishing

FREE CLIP ART & FONTS

TRY US!

Receive 4 unique fonts or
56 original clip art images!

ONLY \$5.00 SHIPPING / PACKAGE

Foreign add \$5.00 per package.

Credit card only.

SATISFACTION GUARANTEED

SMC SOFTWARE PUBLISHERS

(619) 931-8111 EXT 510

CIRCLE 486 ON READER SERVICE CARD

Educational

BACK-TO-SCHOOL SALE: call 800-669-6574

MAKETEST™ organizes questions by topic and difficulty and prints tests and answer keys quickly.

MATHMAKER FONTS™ allow you to type fractions, roots, equations, number lines and grids as text.

CLASSMASTER™ makes grading and attendance easy.

298 FOURTH AVE. N° 401, SAN FRANCISCO, CA 94118 • FAX: 415-752-6506 • FREE DEMOS

CIRCLE 478 ON READER SERVICE CARD



THE ABSOLUTE BEST IN TESTING!

LXR-TEST™ 4.1 is the most advanced and complete testing system available for your Mac!

- Item banking
- Test generation
- Scoring & analysis
- Paper & interactive
- Mark reader support
- Commercial banks
- Character styling w/tabs
- Full graphic placement
- Database selection
- Compatible gradebooks
- Student mastery
- Spelling checker

Highest rated software available in various editions to match your testing needs. Fully guaranteed! Pricing from \$149. For complete brochure & free preview disk; call, write, or fax:

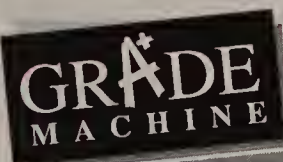
Logic eXtension Resources

9651-C Business Center Drive

Rancho Cucamonga, CA 91730

(714) 980-0046 Fax: (714) 987-8706

CIRCLE 407 ON READER SERVICE CARD



Misty City Software
10921 129th Place NE
Kirkland, WA 98033
(800) 795-0049

Still only **\$79** (\$99 bundled with new Attendance Module)
+\$5 S&H **MONEY-BACK GUARANTEE!**

CIRCLE 413 ON READER SERVICE CARD

GRADING MADE EASY!

The best Mac gradebook just got better.

New Version 5.0 adds student graphs, narrative comments, multiple grading scales, user-defined special scores, password protection and much more. System 7 and network compatible. Not copy-protected. **Affordable** site licenses available.

Engineering

CIVIL • STRUCTURAL
• SURVEYING •

NEW! LANDview™
for CONTOURING
& TERRAIN MODELING

LANDesign™

COGO/Surveying

- Data Collector and Export
- Modules available
- From US\$595 + shipping

FRAME mac™

Structural Analysis

- Frames, trusses, beams
- Full graphics
- US\$595 + shipping

Money-back guarantee. Free support.

Other programs and products:

- Deed plotting
- Road design
- Beam sizing
- Section tables
- Structural design
- Structural properties

For free catalog or info: tel: (416) 738-4601
COMPUneering fax: (416) 738-5207



113 McCreb Crescent
Thornhill, Ontario L4J 2S6
CANADA

CIRCLE 503 ON READER SERVICE CARD

Fonts

High Quality PostScript® for \$5.00* a Font?

PLUS ANOTHER GREAT ADVANTAGE:

**YOU CREATE YOUR
OWN PACKAGE!**

High Quality Type I or TrueType™ Fonts
(for Mac, IBM® and compatibles)
for \$5.00* a Type Face!

With the advantage of
you creating your own package!

HERE'S HOW:

You may choose any 5 Type Styles
from the OPTIFONT™ type catalogues
at the low price of \$149.00

*The \$5.00 per font offer kicks in when you select
any additional font after the initial 5 fonts
(all in the same purchase).

CALL

(708) 695-6530

FAX (708) 675-6563

Send for FREE CATALOGUES

Other Options

Your Order	Total Price
Single font	\$ 47.50
2 fonts	\$ 80.75
3 fonts	\$114.00
4 fonts	\$142.50

OPTIFONT™ CASTCRAFT SOFTWARE, INC.
3649 W. Chase Avenue,
Skokie, IL 60076

FOR A LIMITED TIME ONLY.

All trademarks and register trademarks are the sole property of their respective companies

CIRCLE 418 ON READER SERVICE CARD

Fonts

PRECISION TYPE

17 MALL DRIVE

COMMACK, NY 11725

5 1 6 • 8 6 4 • 0 1 6 7

1 • 8 0 0 • 2 4 8 • 3 6 6 8

AUTHORIZED DISTRIBUTOR FOR:

ADOBE LANSTON
AGFA LETRASET
ALTSYS LINOTYPE
BEAR ROCK LOGOS ON LINE
BITSTREAM MONOTYPE
BRODERBUND PAGE STUDIO
CASADY&GREENE THE FONT CO.
HEADLINERS TREACYFACES
IMAGE CLUB UTF
PLUS CD-ROMS



CIRCLE 485 ON READER SERVICE CARD

Genealogy

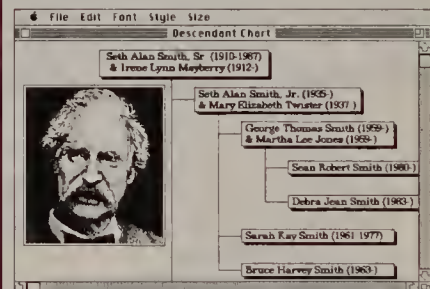
REUNION

the family tree software



MacUser Oct '90

Reunion quickly organizes your family information and images, links and displays color and grayscale pictures, identifies relationships, creates large graphic charts, family group records, family histories, mailing lists, questionnaires, and more.



To order, call MacConnection @ 1-800-334-4444.
For a brochure & sample printouts, contact...

Leister Productions
P.O. Box 289, Mechanicsburg, PA 17055
phone 717-697-1378 — fax 717-697-1373

Family Roots™

Do it YOUR way! Huge variety and capacity for your family history. Make pedigree charts, descendants charts, person sheets, group sheets, indexes and much more. Customize to your own preferences. Standard Mac interface. Call for FREE information. Satisfaction guaranteed. MC/Visa/AE.

Quinsept

Box 216

Lexington MA 02173

617/641-2930

800/637-ROOT

Continued...

For your ad to appear in The Macworld Shopper, please call 800.888.8622

Genealogy

Family Heritage File™

Most powerful and easy genealogy program on Mac. Rated "BEST" by Macworld. Designed by genealogy professionals. •Enhanced •Fully Relational •Graphic Pedigree, Family Group, Individual, Marriage, Sumame •Unlimited History •Sorted Lists •Export to WP/data base/modem. \$149 + 5 s/h. Ask about Family Heritage Bundle. Also, new Jewish Version. Visa/MC. Demo \$7. Free Lit Pak. **Star•Com Microsystems**
Windsor Park East
25 West 1480 North
Orem, UT 84057
801/225-1480

Human Resources

Proven software for growing companies

EmployeeManualMaker™ \$139
Protect your relationship with employees with this personnel handbook (110+ policies and 30+ benefits).

Business GuardDog™ \$159
Keep employees & customers honest — shrewd management insights for you, 77+ procedures and memos (on diskette) for them.

BizPlanBuilder™ \$129
Working business and marketing plan for organizing/financing your business — with text & spreadsheets.

LivingTrustBuilder™ \$139
Preserve your estate. Avoid probate, hassles & taxes with this living trust package.

FREE CATALOG
(800) 346-5426
(415) 941-9191 worldwide

CIRCLE 412 ON READER SERVICE CARD

HyperCard Stacks

MacFlash Cards



Learn a foreign language fast!

Vocabulary tools for all Macintosh computers:

French German

Russian Spanish

Latin Czech Italian

Over 2000 foreign words and 1000 more foreign synonyms.

Only \$25 each. Compare our prices and save! **ORDER TODAY!**

Low price Cyrillic and Czech fonts!

Call or write for more information:

The Language Quest Software Co.
101 First Street Suite 428
Los Altos, CA 94022

800-622-3574 or 415-949-2876

CIRCLE 451 ON READER SERVICE CARD

Languages

FORTRAN on Your Desktop

No need to wait for time on the "big" computer any longer. Language Systems FORTRAN lets you run the same high performance FORTRAN programs at your desk. Full integration with System 7, VAX-compatible extensions, built-in user interface, automatic backgrounding, and direct code generation for the Mac II family make this compiler the most powerful FORTRAN for the Mac. **Language Systems Corp.**
441 Carlisle Drive
Herndon, VA 22070-4802
703/478-0181
703/689-9593 Fax
800/2LANGSY

MACTRAN PLUS Ver. 4.5

Sys. 7 Compatible INTEGRATED Make-For-Mac Development System. Incl: Editor, Optimizing Compiler, Source level Debugger, Linker, Library Manager, Profiler and Build facility. Supports 68020/030 & 68881/2 native code. Significant Vax Fortran & ANSI 8x ext. Hi & Low level tool box interface. Unltd. code segment size. "I believe you easily have the best FORTRAN compiler for Macintosh," Bill White, Texas A&M University. "You have made a number of major improvements that are significant, and it becomes the best FORTRAN Compiler for the Mac." Byron Palmer, Los Alamos Natl. Lab. **DCM Data Products,**
610 One Tandy Center
Fort Worth, TX 76102
817/870-2202
817/336-2416 Fax

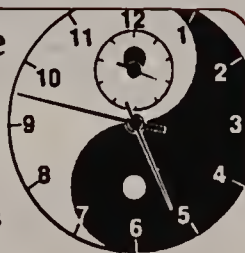
Graphics Translators

Some Translators Are A Waste of Your Time

Don't Get Frustrated... Get CADMOVER®

CADMOVER won't lose your graphic's line weights, crush its layers, gloss over its text or complain that your file is too large.

Quality results are available via IGES, DXF, HPGL, EPSF, CGM, Gerber, DDES2 & a variety of Mac based formats.



Easy to use...
accurate...effective.

Call 703.532.0213

KANDU
Software Corporation

CIRCLE 549 ON READER SERVICE CARD

Import/Export

INTERNATIONAL DISTRIBUTION High-End Solutions

We specialize in
European/Korean/Japanese Products

Fax for prices of Sharp, Danagraf,
Quark, Linotype-Hell & others

Manufacturers/Developers please send
us your product info

PACIFIC DEMAND, INC.

533 Howard Street
San Francisco, CA 94105
Voice: 001-415-512-7790
Fax: 001-415-512-9345

CIRCLE 540 ON READER SERVICE CARD

Human Resources

Frazzzzzled by HR Record Keeping?

Abra 2000 for Employees

- For 10 to 10,000 employees
- Top selling HR system, Mac & PC
- Over 100 Reports + Report Writer
- Starting at \$595 for up to 75 employees

AbraTrak for Applicants

- Find the right candidate—Fast
- Auto letter generator
- 80+ reports, includes EEO & Costs
- From \$995 for Single User

Evaluation System with Manual: \$25 / product

FREE Demo Disk • 408-737-9454



Abra MacDabra
Software

CIRCLE 450 ON READER SERVICE CARD

For your ad to
appear, call
800.888.8622

MACWORLD
MWShopper

Legal



Ready-to-use forms for the most common legal problems
and situations including:

Bill of sale
Bankruptcy forms
Contracts for service
Copyrights
Deeds
Idea nondisclosure
Leases
Living trust
Patents
Power of attorney
Promissory note
Property settlements for divorce
Real Estate agreements
Wills.....and more

\$49.95
only

Easy to use....
Easy to understand

1-800-366-0128

VISA / MASTER CARD

1-(215)-233-1631

CIRCLE 408 ON READER SERVICE CARD

For your ad to appear in The Macworld Shopper, please call 800.888.8622

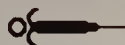
Medical

Care4th™ for Clinicians

Built on the highly acclaimed CareTracker™ system, Care4th™ is a \$649 superb clinical database, decision support system, alert generator, and intelligent medical record program for solo or group use. Physician-designed, it can revolutionize your practice while fitting naturally into your routine. Harness the Mac for your patients' benefit.

Exclusively for Macintosh®

Med4th Systems, Ltd.
716 East Carlisle Avenue
Milwaukee, WI 53217
(414) 963-1985 Voice/Fax



CIRCLE 405 ON READER SERVICE CARD

MacAnatomy™ MacSurgery™

...an electronic atlas of Anatomy in 4 vol. on disk in MacPaint™ format. Easily altered & copied to any program via the clipboard. Ideal for students of Anatomy in all the health & legal professions.

...is a HyperCard™ stack w/multi-choice quest & ans. Detailed discussions & documentations are provided. Ideal for continuing education & board prep.

MacMedic Publications
5805 Westheimer
Houston, TX 77057
713/977-2655
800/477-0717
713/784-3759 Fax

Medical Office Mgmt.

TessSystem™ software for insurance and billing. Our \$1295 package out-performs software selling at three times that price. Expandable line to grow with your needs. Call for product literature and DEMO software today! New modules include electronic claims and multi-user for Mac networks.

Wabash Medical Resources, Inc.
8335 Allison Pointe Trail, Suite 310
Indianapolis, IN 46250
317/579-5900

Music/MIDI

Midischool™



•Full function Sequencer •Built-in Glossary •Student Notebook records your progress •Lesson Planner and Quiz Pages for the classroom

Interactive MIDI Tutor
800-824-4788

\$119

EduACTIVE (603) 668-4788

CIRCLE 465 ON READER SERVICE CARD

Public Domain

FREE
MAC & IBM SOFTWARE
CATALOG
32 Pages! ASP Member

SOFTSHOPPE, INC.

P.O. BOX 19069
IRVINE, CA. 92714
Tel: (714) 261-0114
FAX: (714) 261-0116



Toll-Free—24 Hrs.
1-800-851-8089

Multimedia

THE MULTIPLE MEDIA TOUR™

This brand new CD-ROM contains over 1500 spectacular, royalty free, multimedia resources for all optical publishing projects. Save time and money! A must for serious developers! Send for free demo!



AUDIO VISUAL GROUP

398 Columbus Ave., Ste.355 Boston, MA 02116-6008 (617) 381-1609

CIRCLE 472 ON READER SERVICE CARD

VERSION 2.3

PRACTICA MUSICA

Ear Training and Music Theory for Everyone

Teaches intervals, chords, melody, rhythm
•Interactive staff notation •Saves scores
•High quality sound •MIDI compatible
•Historical & computer-generated melodies
•Custom ear training melodies
•Includes textbook •Beginners to advanced

\$125.00 • Call Toll Free 800-445-4866

ARS NOVA
BOX 637, KIRKLAND, WA 98083

CIRCLE 489 ON READER SERVICE CARD

Call
800.888.8622
to reserve your space
in The MW Shopper
today!

Continued...

Music/MIDI

Compose yourself \$99-

Complete "How To" Composing Package

8 Track Sequencer • Chord Computer • Composer Strategies HyperCard Stack • Cassette Tape • Complete Composition Manual • Call for Details

800-MAC-BEAT
505-473-4929 FAX 505-473-4647

Mac BEAT

CIRCLE 438 ON READER SERVICE CARD

Call Now! **DIGITAL**

Hard Disk Recording DAT Macintosh MIDI Instruments
Coda Mark of the Unicorn Passport Dr T's Opcode
Digidesign Roland J.L. Cooper and more

FREE CATALOG 800-MAC-BEAT
505-473-4929 Mac BEAT

CIRCLE 433 ON READER SERVICE CARD

For your ad to appear in The Macworld Shopper, please call 800.888.8622

Public Domain

FREE! 6/3.5" DISKS FULL OF VIRUS-FREE SOFTWARE

- Games
- Utilities
- Hypercard
- Religion
- Education
- and more!

PAY \$5.00 SHIPPING / PACKAGE

Foreign add \$5.00 per package.
Credit card only!

SATISFACTION GUARANTEED
SMC SOFTWARE PUBLISHERS
(619) 931-8111 EXT 511

CIRCLE 487 ON READER SERVICE CARD

Real Estate

REAL ESTATE SOFTWARE

MIBEK Corporation, the nation's leader in Real Estate Software for the Mac is offering: THE TEN MINUTE PROPERTY MANAGER (\$495/\$995), PRO ANALYSIS, investment analysis (\$295) & THE REAL ESTATE EDGE, client database, marketing, farming (\$395) Check/MC/Visa.
MIBEK CORPORATION
31 Parker Way
Santa Barbara, CA 93101
805/963-7181

Religion

ROLL CALL

Church Management Software



ROLL CALL, featuring the power of 4th DIMENSION®, is a premier shepherding tool providing church leadership with a full range of management capabilities.

- Attendance
- Visitation Mgt.
- Directories
- Personal Records
- Pledges
- And More!

ORDERLINE: 1-800-554-9116

\$495⁰⁰ Comprehensive Package / Demo \$5⁰⁰

By The Numbers • 58117 Homer Avenue
Elkhart, IN 46517-3207 • 219-293-4893



CIRCLE 439 ON READER SERVICE CARD

Religion

Church Data Master Plus

now for
Macintosh or Windows
CDM+ is the only comprehensive church data management program for either Mac or Windows. Available as single modules or integrated. Membership, Contributions and Accounting. Priced from \$265. Full featured demo with video \$10.

Computer Helper Publishing
5898 Cleveland Avenue
Columbus, OH 43231
800/533-5227
614/895-7071

Thompson Chain HyperBible™

The ONLY Bible study software that uses the Thompson Chain-Reference® system. Much more than a Bible word-search program, HyperBible offers you dozens of benefits that you can't get anywhere else. Complete with •Maps •Outlines •Character Studies •Topical Studies •Archaeology •Helps. Easy enough for kids, sophisticated enough for scholars. Demo \$5. MC/Visa. Overnight delivery avail. for Mac or Windows. \$149.
Kirkbride Technology Division
335 West 9th Street
Indianapolis, IN 46206-0606
800/428-4385, Operator 110

Sales/Marketing

Sell More, Work Less!!!

MARKET MASTER AUTOMATES the sales follow up you don't have time for and keeps the contacts happening! More than a mere contact manager, it's a SALES LEAD HANDLER! You get unmatched simplicity and maximum control. Versions available for one rep or a whole sales force! Six years on the market - everything works. 30-Day money-back guarantee. Demo Disk \$10.00.
Breakthrough Productions
210 Park Avenue
Nevada City, CA 95959
916/265-0911
916/265-8036 Fax

Scientific



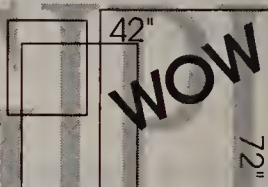
RockWare
Scientific Software

4251 Kipling St., Suite 595
Wheat Ridge, CO 80033
(303) 423-5645 • FAX (303) 423-6171
RockFAX • (303) 423-7112
*FAX on-demand product information

FREE SOFTWARE CATALOG!
Over 300 scientific applications for the Mac & PC!

Sign Making

ENLARGE your color image with quality, quickness and precision. From your Mac or PC design, we can enlarge up to 42" wide. It will WOW you and your customers.



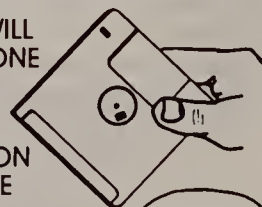
ENLARGE YOUR IMAGE!

DigiPlot Services, Inc. 345 N. Canal St., Chicago, IL 60606. 800.PRO.PLOT

CIRCLE 411 ON READER SERVICE CARD

"OVERNITE" US YOUR "Mac" DESIGNS...

...AND WE WILL SEND YOU ONE "LARGE" 4 COLOR PRESENTATION BLOW-UP THE NEXT DAY!



ORDER TODAY AND WE WILL SEND YOU AN 8" x 10" 4 COLOR "HANDOUT"

FREE!

FOR MORE INFORMATION -
CHECK ☒ AND FAX BACK TO:
1-708-392-3989

☐ SEND ME A BROCHURE

NAME _____
COMPANY _____
ADDRESS _____
PHONE _____
SCANGRAFICS 1-708-392-3980

CIRCLE 466 ON READER SERVICE CARD

Specialized Fonts



LAZY DOG FOUNDRY

Personal
FONTS™

Handwriting Converted to Type One
Postscript® Fonts, 80 Characters,
75 Kerning Pairs \$199.99

CLASSIC & UNIQUE

From Sweet to Slick, fonts starting at just \$69. Packages of ten at \$99. Call for free information, prices and "Personal Font" ordering pack.

800-876-9807

PH 612-291-0306 • FAX 612-291-0481

CIRCLE 432 ON READER SERVICE CARD

Stock UP
with

The Macworld
MW Shopper

For your ad to appear in The Macworld Shopper, please call 800.888.8622

CATALOG

MACWORLD
MWShopper

Services

Computer Insurance



SAFEWARE
INSURES YOUR COMPUTERS

Full replacement of hardware, media, purchased software. As low as \$49 yearly. Covers fire, theft, power surges, other accidents. Blanket coverage; no list of equipment needed. Call for information or immediate coverage.

1-800-848-3469
Local (614) 262-0559

SAFEWARE, The Insurance Agency Inc.
2929 N. High Street, P.O. Box 02211
Columbus, OH 43202

CIRCLE 522 ON READER SERVICE CARD

COMPUTER INSURANCE PLUS

- + Replacement with no depreciation
- + Covers computer hardware in home or office
- + Easy to read policy
- + Bonus 20% for software coverage
- + Low \$50 deductible
- + Covers theft, fire, power surges, accidents, natural disasters, even earthquakes and flood
- + Policy backed by an A+ company

THE COMPUTER INSURANCE AGENCY, INC.
6150 Old Millersport Road, NE
Pleasantville, OH 43148

1-800-722-0385

CIRCLE 523 ON READER SERVICE CARD

Computer Repair

!!REPAIR BY MAIL

Real low cost, super fast turn-around. Mac Plus, Mac logic boards \$95+ parts; 1 yr. warranty. Plus and SE power sweep swap as low as \$69+ s/h; 1 yr. warranty. Drive repairs as low as \$35. Keyboard repairs as low as \$12.50+ s/h. New and used hardware for sale. School orders welcome. Open 12 noon-5, 6:30-10pm eastern M-Sat. We buy dead Apples, Macs, PCs.
Arminius Pubs. & Prods. Inc.
P.O. Box 1265/8519 Orchard Ave.
Merchantville, NJ 08109
609/662-3420

Computer Repair

MAC REPAIR

Mac Shop Northwest

- Apple™ Certified Technicians
- One-Day Service Turnaround*
- Hard Disk Repair & Data Recovery
- Up to 75% below Dealer Rates
- Component-Level Repairs
- Expert Advice and Prices by Phone
- Power Supplies & Logic Boards
- Lifetime Repair Warranty*

*on many repairs. Visa/MC/AX. Fast overnight shipping available. We use genuine Apple™ parts.

1-800-MAC-SHOP

CIRCLE 515 ON READER SERVICE CARD

800 WE-FIX-MACS

Flat Rate 24 hr. Turnaround

128 to Plus Power Supply	\$59
SE & SE/30 Power Supply	\$99
SE & SE/30 Analog Board	\$69
800K/1.4 MB. Disk Drive	\$79/\$99
Mac Plus/SE Logic Board	\$149/175
SE/30/Mac II Logic Board	\$195/225

(800) 933-4962 Visa/MC

2338-M Walsh Ave., Santa Clara, CA 95051

We Also Repair Other Mac Parts

CIRCLE 565 ON READER SERVICE CARD

Data Conversion

DATA CONVERSION

If you want the most complete conversion services in the industry, just call...



(800) CONVERT

Capabilities include over 3000 formats.

PIVAR COMPUTING SERVICES, inc.®

165 Arlington Heights Rd. #MW
Buffalo Grove, IL 60089
(708) 459-6010

Data Recovery



CPR has been recognized in national magazines for its data recovery techniques and the ability to repair SCSI drives.
Computer Peripheral Repair & Recovery Services, Inc.

"Data Crash! ... We're Going In!!"

7570 S. U.S. Hwy. 1, Ste. 8 800-765-9292 407-586-0011 Ph
Hypoluxo, FL 33462 407-582-7921 Fax

CIRCLE 452 ON READER SERVICE CARD

WE CAN SAVE IT!



- * Macintosh Data Recovery
- * Repair any Mac Hard Drive
- * Optical/SyQuest Recovery
- * Fast Nationwide Service

30-D Pamaron Way
Novato, CA 94949

CIRCLE 510 ON READER SERVICE CARD

Slides

SlideImagers®

Any Output, Any Format, Any Software,
24-hours-a-day: Only \$4.95

Overnight
\$4.95
Any Output

- Slides
- Overheads
- Canon Fiery Color Lasers

Adobe PostScript™ Imaging
24-hour turnaround standard. We support all major software packages with fast, efficient service and unbeatable quality. See how easy imaging can be... CALL TODAY!

(800) 232-5411
(404) 874-6740

CIRCLE 456 ON READER SERVICE CARD

Sep-FreeSM Color Short Run Printing

quality without plates & separations

Slides from \$3.00 Scans, Overheads

Mastercard/Visa - 24 Hr. Service

Elegant Graphics
750 Princeton Ave., Box 774607
Steamboat Springs, CO 80477
(303) 879-4334, FAX (303) 879-5206
Modem/BBS (303) 879-5210

CIRCLE 527 ON READER SERVICE CARD

Laser Recharge

reconditioned TONER cartridges!



BETTER THAN NEW!

- 20% MORE TONER
- DARKER PRINT
- 100% GUARANTEED

Willow Products Corp.
3857 Willow Ave., Pgh, PA 15234

for laser printers & Canon PC Copiers

From **\$44.95**

We buy empties
call for brochure
800-426-8196



CIRCLE 445 ON READER SERVICE CARD

For your ad to appear in The Macworld Shopper, please call 800.888.8622

Slides

We Image
MAC
MAC
MAC
MACINTOSH
MACINTOSH

SLIDES
We're
MAC
SLIDE
EXPERTS

That's what makes us so good!

MACINTOSH ONLY

In NY State Call
212.989.2727
Outside NY State Call:
800.445.9002

**Nextwave
Productions
NYC, NY**

\$5 Non-PostScript \$10 PostScript
24-hr slides, 4K resolution (standard)
Volume discounts and rush available.

CIRCLE 488 ON READER SERVICE CARD

Accessories Diskettes

FORMATTED DISKETTES BASF, VERBATIM, SONY

WITH FORMAT	QTY 250 MIX & MATCH	WITHOUT FORMAT
\$.41	5.25" DS/DD	\$.36
\$.62	5.25" DS/HD	\$.54
\$.63	3.50" DS/DD	\$.53
\$.99	3.50" DS/HD	\$.89


- **FREE FORMATTING** on First Order
- **TYVEC SLEEVES** & Labels Included
- **COLORED MEDIA** Please Add \$.05
- **VOLUME DISCOUNTS** Available
- **SAME DAY** Shipping
- **MONEY BACK GUARANTEE**

800-255-3142
Diversified Systems Group, Inc.
PO Box 1114, Issaquah WA 98027

CIRCLE 496 ON READER SERVICE CARD

Cases

Pack your
Powerbook
in seconds!



**WEST
RIDGE
DESIGNS**

1236 N.W. Flanders, Portland, OR 97209
CALL TOLL FREE! 1-800-548-0053

CIRCLE 444 ON READER SERVICE CARD

Cases

REUSABLE ATA* Shipping Cases



Star Cases can be specially
designed to fit your exact
requirements. Call for pricing.
All major credit cards accepted.

**(800)822-STAR
(800)782-CASE**
★ STAR CASE
"FREE" Case Catalog

CIRCLE 558 ON READER SERVICE CARD

Powerbook Protection!



MacLuggage™
is also available for the
Macintosh LC, IIsi, Classic
and others. Sold through
Fine Dealers Worldwide.
1-800-241-2122
I/O Design, Inc.
Box 156, Exton, PA 19341

CIRCLE 459 ON READER SERVICE CARD



The Best Case Scenario

Airline Check-in or Local Use
Zero Halliburton Aluminum Mac Cases:
Lightweight, Durable, Distinctive Styling
PowerBook & Portable Attaches Classic/Plus/SE
IIsi/ci IIsi LC IIsi/fx Monitor & Printer Cases
from \$299.95 **1-800-542-4591**
1-310-578-9710

TCC 131/11 Wash Blvd #111 I & CA 90066

CIRCLE 403 ON READER SERVICE CARD

Covers

DUST COVERS

Please Call
With Any
Questions!

ALL FABRIC

- Heat Ventilating, will not become stiff or crack with age! • Easy to Use • Machine Wash & Dry!
- Highest Quality, Custom-Fit!
- All makes & models! • Custom orders! • Tan, Navy, Royal, Red, Maroon, Gray, Brown or Black.
- 100% Satisfaction Guaranteed!
- Outstanding service since 1983!

11-30 Mac Classic & Kybd.....	24.95	10-86 Mac SE or II Ext Kybd..	9.95
10-74 Mac SE & Std Kybd.....	24.95	11-34 AppleColor 13"HR Mntn.	19.95
10-75 Mac SE & Ext Kybd.....	24.95	11-23 Radius Pivot Monitor....	24.95
11-35 Mac IIsi Computer Only	15.95	10-95 Radius TPD - 19".....	24.95
11-36 Mac IIsi, 13"HR Cir & Kb.	29.95	11-22 Super Mac 19" Cir Mntn	29.95
11-37 Mac IIsi, 12" Mtr & Kb..	29.95	10-37 ImageWriter II.....	15.95
10-73 Mac II, Cir Mtr & Ext.Kb	29.95	10-90 LaserWriter II.....	24.95
11-02 Mac II, IIsi, IIfx CPU.....	19.95	11-25 Personal LaserWriter...	24.95
11-01 Mac IIsi Computer Only	15.95	11-52 StyleWriter.....	15.95
10-98 Mac IIsi, Cir Mtr & E.Kb	29.95	91-22 H-P DeskWriter.....	19.95
11-33 Mac LC, 13" RGB & Kb	29.95	11-40 T.I. microLaser PS.....	19.95
11-32 Mac LC, 12" Mntn & Kb	29.95	SKIN Keyboard Skins.....	21.95*

Add \$4.00 Shipping & Handling (Check, MO, COD, VISA/MC) *MW Spcl

CO-DO-CO Computer Dust Covers
4802 W. Wisconsin Ave., Dept. MW, Milwaukee, WI 53208
800-735-1584 414-476-1584 • 476-9329 FAX

CIRCLE 455 ON READER SERVICE CARD

DUST COVERS 100%
COTTON CANVAS

ComputerWear

MAC, SE, II, & PRINTERS
Beige w/ Grey Trim Breathable! Static-Free!

NEW! Seal-Skins
For Keyboards

1-(800) 826-5761
Int'l: (415) 759-1466 Fax: (415) 564-0506
Contemporary ComputerWear 1320-36th San Francisco 94122

CIRCLE 507 ON READER SERVICE CARD

Supplies

Double Your Money!

Receive Over 75 Samples of Paper Stock, and 25 Samples of Pre-Printed Layouts for Announcements, Brochures, Bulletins, and Certificates. They're all ready for you...

DESKTOP PUBLISHING AND LASER PRINTING NEEDS

All Tested and Proven (Test them on your Laser Printer!)

- All full-sized 8 1/2" x 11" Sheets
- From Elegant to Exotic • Also includes a Paper!
- Small or Large Quantities Guide Wheel
- In Stock for immediate Delivery

Double Your Money: Samples cost only \$5 and we'll include a \$10 Certificate good towards your first purchase!

Order Now! Offer expires 12/31/92.

THE STATIONERY HOUSE
1000 Florida Ave., Hagerstown, MD 21741

Call: 1-800-638-3033 and have your credit card number handy. Mention Special Code: G2337 or mail the coupon below.

☐ Please send me the Kit of Sample Products for Desktop Publishing and Laser Printing; Item No. PKIT. Enclosed is my check for \$5.

Name _____

Company _____

Address _____

City _____ State _____

Zip _____ Telephone _____

100% SATISFACTION GUARANTEED

CIRCLE 564 ON READER SERVICE CARD

MACWORLD
MWShopper

**#1 in bringing
buyers and sellers together.**

For your ad to appear in The Macworld Shopper, please call 800.888.8622

MACWORLD

PRODUCT LAUNCH

SECTION

Turn to the Product Launch Section of Macworld for information on the new products in the Macintosh industry.

This is the premiere showcase for new product launches or relaunches. Look to the Macworld Product Launch section—your source for the newest Macintosh products.

Call your account executive
for more details on advertising
in the Macworld Product Launch section!
(415) 243-0505



We've got your number.



The System 7 Super CD.

Do System 7 right with CD7! Start with this incredible collection of great utilities, system savvy extensions and control panels, desk accessories, custom icons, productivity and networking software plus other new System 7 enhancements. Install your own super-customized System 7.0 or 7.0.1 on any Macintosh directly from the CD or create your own set of master floppies. CD7 is an absolute must for System 7 enthusiasts and all modern Macintosh users.

Quantum Leap
CD SOFTWARE

We deliver great value.

1-800-762-2877
(305) 885-9985 • Fax (305) 885-9986

Circle 103 on reader service card

World's First Dual Capacity – 256MB/128MB Rewritable 3.5" Magneto-Optical Drive Introductory Offer – only \$1,748



VISTA V256

- ◆ **Full compatibility** – Vista V256 reads & writes to ISO Standard 128 MB format cartridges, and a true, non-compressed 256MB to GZ format cartridges
- ◆ **Reliable** – features the acclaimed M.O.S.T. mechanism as used in the award-winning Vista V128 3.5" MO drive
- ◆ **Fast** – transfer rate up to 1.2 MB per second
- ◆ **Economical** – additional 256 MB cartridges only \$89
- ◆ **Versatile** – Mac and IBM compatibility

Order Direct **800.944.6232**

O·C·E·A·N

O·C·E·A·N Microsystems, Inc.
246 Hacienda Avenue
Campbell CA 95008 USA

Circle 62 on reader service card

PORTABLE DATA STORAGE



"Liberty 50-105Q"

BATTERY POWERED DRIVES
EXTEND YOUR POWERBOOK

NEW! BATTERY LIFE! World's Smallest

- Power supply, Charger, and Batteries Built-in
- Elegant State of The Art Compact Design
- No External Power Bricks
- Rugged, Fast, and Light



MAC & IBM

- Removable Cartridge Capability
- Plug-n-Play
- Fast SCSI Interface
- Customer Satisfaction GUARANTEED!

120MB with 6 hr. battery and internal charger.
120MB removable cartridges optional.

All Liberty Drives Are Designed With
Portability In Mind

Hard drives from 40MB - 2.1GB, 160MB Tape, 2.1GB DAT, 90MB Bernoulli®, 88MB/44MB Syquest®, 128MB & 650MB Magneto Optical, CD-ROM. All drives include an internal power supply.

Liberty
Systems

160 Saratoga Ave. Suite 38
Santa Clara, Ca. 95051

(408)983-1127

Fax. (408)243-2885

Circle 45 on reader service card

CD-ROM EXPLOSION!

We'll meet or beat any advertised price on CD-ROM products!

NEC CD-ROM drive, 8 best-selling CD-ROM titles, amplified stereo speakers and headphones-\$499!

Now is the time to join the **CD-ROM revolution!** These new NEC bundles include hardware, driver software, cables, external amplified stereo speakers, batteries, headphones and 8 interactive, best-selling CD-ROM titles (a value of over \$1,300). Everything you'll need to get started. All in one complete package for only \$499!

Titles included are: Grolier's Illustrated Encyclopedia • Time Table of History • World Atlas • Beethoven's 9th Symphony • Cosmic Osmo • Desert Storm • Cinderella • The EDUCORP CD Sampler. With the: **NEC CDR-37 only \$499 (\$1300 value) #C1969 or NEC CDR-74 only \$739 (\$1500 value) #D1970.**

Choose from 3 other money-saving bundles – call for details and your free catalog.

1-800-843-9497

2 FREE CDs

Buy 3 other CDs with your drive and ANY bundle in this ad on your 1st order and you'll get the Environmental Data Disc and Economic Data Disc FREE! (a value of \$300) Use code D3.



Drive	Access Time	Buffers	SCSI Settings	Volume Control	Audio Software	SCSI Ports	Terminator	Termination	RCA Jacks	Maximum Voltage	Data Transfer	Reliability MTBF	Warranty	MAC Price	MAC Part
NEC CDR-37	450ms	64K	Dip Switch	Dial	Music Box DA	1	Not Included	Internal Termination	No	120 Volts	150K/Seconds	10,000	2 Year	\$479	196
NEC CDR-74	280ms	64K	Dip Switch	Dial	Music Box DA	2	Included	Not Terminated	Yes	220 Volts	300K/Seconds	25,000	2 Year	\$639	197
CD Tech CD-T3301	325ms	64K	Push Button	Dial	CD Remote DA	2	Not Included	Not Terminated	Yes	250 Volts	150K/Seconds	50,000	2 Year	\$599	198

2 FREE CDs-America Alive and Multimedia Handisc with the purchase of CD-Technology Porta Drive.

Now over 275 CD-ROM titles in stock!

We'll meet or beat any advertised price on CD-ROM products!

Desktop Publishing

- 1857 BackImpact! Pro149.95
- 1622 Backgrounds/Multimedia v.1..229.00
- 1629 Backgrounds/Multimedia v.2..229.00
- 1621 Full Page Images399.00
- 1680 GraphTec.....49.95
450 color and b/w EPS.
- 1807 Marble & Granite-NEW!.....299.00
- 1856 SlickArt Plus Lettering/bknds.199.95

New Digital Stock Photography!

- 1735 People in Business
200 color photos.....129.95
- 1696 Nature's Way
150 color photos.79.95
- 1822 Ocean Magic
160 color photos89.95
- 1595 Swimsuit CD 200 color photos 199.00
- 1686 Kids 200 color photos.129.95
- 1813 World Travel v.1: Europe.....129.95
200 color photos including background photo of the Swiss Matterhorn.

Education

- 1924 ABC Songbook.....29.95
Have fun with these rockin' tunes and funny stories through all 26 letters of the alphabet.
- 1775 AmandaStories49.95
- 1603 Anatomist Learn anatomy.....249.00
- 1667 Benjamin Bunny39.95
- 1893 Berlitz Think & Talk French.139.95
- 1850 Just Grandma and Me39.95
- 1768 Monarch Notes79.95
- 1785 View from Earth.....64.95
- 1566 Dictionary/Living World 2.5..199.00
EDDY AWARD WINNER! "A brilliantly conceived multimedia database of life on Earth." MacUser Magazine
- 1925 Dinosaurs Multimedia Encyclopedia149.00
Over 100 movie clips and animations, dinosaur index, dinosaur skeletons, interview paleontologists, more!
- 1753 Creepy Crawlies99.00
- 1570 LifeSaver 2.099.00

Video/Tools for Multimedia

- 1677 ClipTime v.1.....169.95
- 250+ QuickTime movie clips.
- 1701 Digital Video Library .129.95
Over 180 QuickTime movies.
- 1565 Grooves 100 music clips99.00
- 1897 MultiWare59.95
QuickTime, sounds, more
- 1582 Sound/FX225 sounds. 179.00
- 1847 Stingers 98 music clips.79.95
- 1659 WraptureReels One 179.95
- Video footage of nature scenes, 3-D animations, audio.
- 1653 Wraptures One.....95.00
Fine seamless textures.

Entertainment/Consumer

- 1908 Battle Chess59.95
Animated pieces march across a 3-D chess board and fight to the death.
- 1339 Cosmic Osmo49.95
- 1300 EDUCORP CD-ROM 7.0199.00
NEW! Over 1 gigabyte of software! \$50 off with the purchase of a CD-ROM drive from EDUCORP.
- 1327 Exotica-ROM 3.0-NEW!.....199.00
200 exotic pictures. Now includes QuickTime video with artist Olivia De Berardinis.
- 1849 Funny QuickTime comedy clips...33.00
- 1306 Manhole29.95
- 1909 So You Want to be a Rock-n-Roll Star Teaches piano and guitar.99.95
- 1737 Sherlock Holmes Consulting Detective Solve 3 murder mysteries 59.95
- 1381 Virtual Valerie ADULTS ONLY!....79.95
- 1583 Spaceship Warlock69.95
BEST CD-ROM—1991 Game Hall of Fame.

SHAREWARE

800k disks low as \$4.99 ea

Packed with our finest Shareware! Individual disk start at \$6.99 each, buy 5 for \$5.99 each, or buy 10 or more for only \$4.99 each.

800K Disks

- 4414 MacConcept 3-D graphics program.
- 2129 ResEdit/CICN Editor
Edit and manipulate resources
- 2169 System 7 Utilities v.1 - **NEW**
13 great utilities for System 7 users.
- 3936 Color Startup Screens v.1 - **NEW**
- 2122 Virus Stompers
Contains the latest version of Disinfectant.

3948 Color Arcade Games v.1 - **NEW**



Four System 7 compatible color games.

7204 Clip Art Stack 490 bitmapped pictures.

- 4291 Arcade Games v.1 - **NEW**
Glider, Pararena and 3 other fun games.
- 3460 Early Education v.2 - **NEW**
Contains MacTuberling and 3 more fun programs for kids.
- 4650 System 7 Beep Sounds v.2 - **NEW**
Double click on a file to hear it. Copy it to your System file to add new beep sounds. Choose from over 40 different sounds.

NEW! 5-Disk Sets \$24.95 ea.

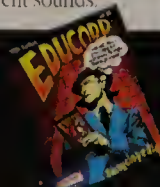
- 1123 Best of Utilities v.3 Some require System 7.
- 1124 QuickTime Set 5 QuickTime movies for a color Mac. QuickTime extension included.
- 1118 Best of EPS Clip Art v.2
- 1126 Best of True Type Fonts v.2
Over 40 great fonts for System 7 users.
- 1117 Best of Color Games v.2 11 color games. 13" monitor or larger required w/256 colors.



EDUCORP 1-800-843-9497

Dealer Inquiries Welcome

Toll-free in the U.S. and Canada



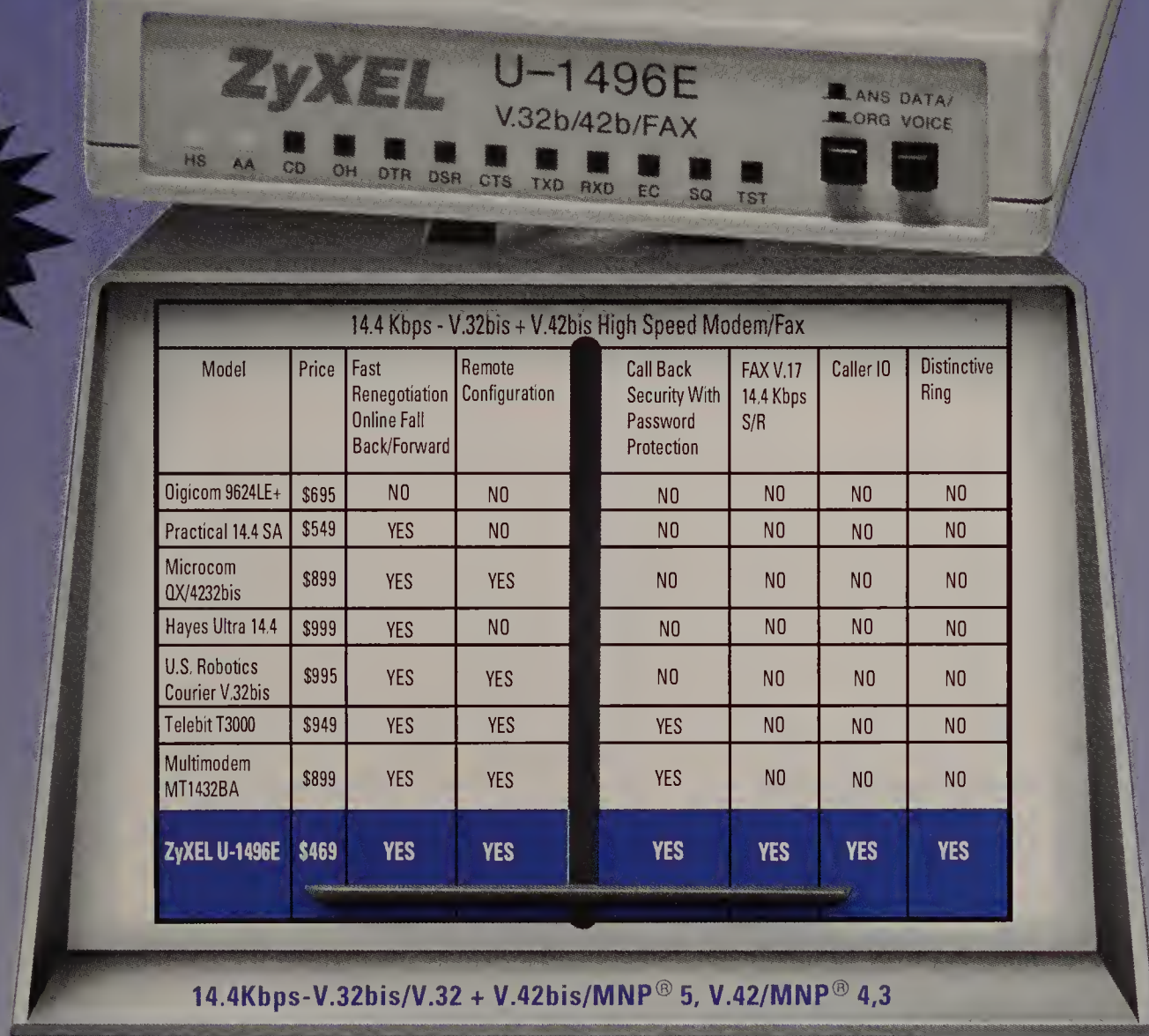
FREE CATALOG!

Call for your free software encyclopedia

WEIGH THE OPTIONS

**ONLY!
\$469**

Also Available:
PC Plug-In Card
U-1496 B \$449



ZyXEL U-1496E
V.32b/42b/FAX

HS AA CD OH DTR DSR CTS TXD RXD EC SQ TST

ANS DATA /
ORG VOICE

14.4 Kbps - V.32bis + V.42bis High Speed Modem/Fax

Model	Price	Fast Renegotiation Online Fall Back/Forward	Remote Configuration	Call Back Security With Password Protection	FAX V.17 14.4 Kbps S/R	Caller ID	Distinctive Ring
Digicom 9624LE+	\$695	NO	NO	NO	NO	NO	NO
Practical 14.4 SA	\$549	YES	NO	NO	NO	NO	NO
Microcom QX/4232bis	\$899	YES	YES	NO	NO	NO	NO
Hayes Ultra 14.4	\$999	YES	NO	NO	NO	NO	NO
U.S. Robotics Courier V.32bis	\$995	YES	YES	NO	NO	NO	NO
Telebit T3000	\$949	YES	YES	YES	NO	NO	NO
Multimodem MT1432BA	\$899	YES	YES	YES	NO	NO	NO
ZyXEL U-1496E	\$469	YES	YES	YES	YES	YES	YES

14.4Kbps-V.32bis/V.32 + V.42bis/MNP® 5, V.42/MNP® 4,3

The features you want in a High Speed-14.4Kbps Modem/Fax. At nearly half the Price!

ZyXEL's U-1496E offers all the standard features available in a 14.4Kbps- V.32bis+V.42bis modem/fax with DTE speeds up to 57.6Kbps. But you'll also find features you'd expect in only the "top-of-the-line" modems. So why pay more for the features you want, when you can get the best value from ZyXEL for less?

Caller ID/Distinctive Ring

Displays the caller's phone number, time and date stamp directly on your screen, and responds to the distinctive rings for incoming fax or modem calls.

Enhanced FAX

14.4Kbps G3 fax with automatic detection of fax or modem calls. Automatically receives, stores and/or prints faxes with our FREE ZFAX software.

Automatic Fast Rate Renegotiation

Online automatic speed fall-back/fall-forward allows the highest throughput achievable during poor line conditions.

Multi-Level Security

Security password protection and automatic call-back features are designed so only authorized callers can access your system.

Nonvolatile Memory Storage

Store up to 4 user configuration profiles in NVRAM, plus up to 10 user phone numbers and their associated passwords.

Software/System Compatible

Supports V.25bis autodial and enhanced AT Command Set, ensuring compatibility with popular communications/fax software. Available with MAC™, Windows™ and DOS fax software packages.

Guarantees

We offer a Full 5 year Parts and Labor Warranty, a 30 day money back guarantee and full BBS technical support line.

Once you've weighed the options, you'll agree: ZyXel's U-1496E offers the best value for less than any other modem/fax in its class. So, don't hesitate. **Call Today.**

ZyXEL USA
(800) 255-4101

Reseller discounts available

TEL (714) 693-0808

FAX (714) 693-0705

BBS/Tech.Support
(714) 693-0762

ZyXEL USA, 4920 E. LaPalma Ave., Anaheim, CA 92807
All brand names and trademarks are the property of their respective owners.
Comparison chart was completed in May, 1992.

Circle 107 on reader service card



Editor's Choice: ZyXEL U-1496E
German Edition, 4/92

Best-Sellers

OCTOBER 1992

Months on chart
▼ Last month
▼ This month

Business Software

89	2	1	Microsoft Word <i>Microsoft Corporation</i>
11	3	2	Microsoft Office <i>Microsoft Corporation</i>
80	1	3	Microsoft Excel <i>Microsoft Corporation</i>
41	4	4	WordPerfect for the Macintosh <i>WordPerfect Corporation</i>
10	5	5	MacDraw Pro <i>Claris Corporation</i>
41	6	6	FileMaker Pro <i>Claris Corporation</i>
67	8	7	Microsoft Works <i>Microsoft Corporation</i>
3	9	8	ClarisWorks <i>Claris Corporation</i>
76	11	9	Aldus PageMaker <i>Aldus Corporation</i>
10	7	10	Aldus Persuasion <i>Aldus Corporation</i>
27	10	11	Quicken <i>Intuit</i>
64	15	12	MacDraw II <i>Claris Corporation</i>
4	13	13	1-2-3 for the Macintosh <i>Lotus Development</i>
28	—	14	Adobe Illustrator <i>Adobe Systems</i>
65	14	15	MacWrite II <i>Claris Corporation</i>

Education Software

56	1	1	Reader Rabbit <i>The Learning Company</i>
42	3	2	Where in the World Is Carmen Sandiego? <i>Broderbund Software</i>
23	2	3	Where in Time Is Carmen Sandiego? <i>Broderbund Software</i>
27	4	4	Where in the USA Is Carmen Sandiego? <i>Broderbund Software</i>
67	5	5	Math Blaster <i>Davidson & Associates</i>

Months on chart
▼ Last month
▼ This month

Entertainment Software

29	2	1	Tetris <i>Spectrum HoloByte</i>
1	—	2	King's Quest V <i>Sierra On-Line</i>
54	1	3	Microsoft Flight Simulator <i>Microsoft Corporation</i>
1	—	4	Space Quest III <i>Sierra On-Line</i>
18	3	5	Crystal Quest <i>Casady & Greene</i>

Network/Data Communications

35	1	1	PhoneNet <i>Farallon Computing</i>
58	2	2	AppleShare <i>Apple Computer</i>
4	3	3	AppleTalk Remote Access <i>Apple Computer</i>
65	—	4	TOPS <i>Sitka Corporation</i>
12	5	5	SmartCom II <i>Hayes Microcomputer Products</i>

Add-In Boards

18	1	1	Macintosh IIsi NuBus Adapter Card <i>Apple Computer</i>
4	3	2	Macintosh II FDHD Upgrade <i>Apple Computer</i>
22	2	3	Macintosh Display Card 8•24 <i>Apple Computer</i>
19	5	4	Pivot <i>Radius</i>
18	—	5	Radius TPD Interface <i>Radius</i>

Months on chart
▼ Last month
▼ This month

Utility Software

17	1	1	After Dark <i>Berkeley Systems</i>
23	2	2	Norton Utilities for Macintosh <i>Symantec Corporation</i>
28	4	3	SAM <i>Symantec Corporation</i>
7	5	4	More After Dark <i>Berkeley Systems</i>
18	3	5	Virex <i>Microcom</i>

The AmCoEx Index of Used Macintosh Prices

Machine/RAM/ Hard Drive	Average Sale Price	Monthly Change
Mac Plus/1MB/none	\$325	\$0
Mac Plus/2MB/20MB	\$475	-\$75
Mac SE/2MB/20MB	\$800	-\$25
Mac Portable/1MB/40MB	\$850	-\$300
Mac Classic/2MB/40MB	\$750	-\$25
Mac SE/30/2MB/40MB	\$1675	+\$25
Mac LC/2MB/40MB	\$950	-\$100
Mac II/4MB/40MB	\$1775	\$0
Mac IIsi/3MB/40MB	\$1825	-\$25
Mac IICx/4MB/80MB	\$2350	-\$75
Mac IIci /4MB/80MB	\$2850	-\$100
Mac IIfx/4MB/80MB	\$3700	-\$200
Apple 12-inch B&W display/board	\$225	-\$25
Apple 13-inch RGB display/board	\$600	-\$25
LaserWriter Plus	\$1050	+\$50
LaserWriter IINT	\$1700	-\$50

Index provided by the American Computer Exchange of Atlanta, Georgia. It reflects sales during the week of July 20. Configurations include keyboard and exclude monitor and display board for noncompact models.

Source: Exclusive Audits & Surveys research from more than 250 Macintosh retailers and selected mail-order vendors. Covers sales during June 1992.

Mirror Introduces Desktop Performance For Your Powerbook...

With Mirror's exciting new peripherals, your PowerBook can function just like a desktop machine, with a high resolution monitor and plenty of storage.

The **Mirror PowerVision™**, an internal video board for the PowerBook 140 or 170, works with a variety of standard monitors, including our NEW 14-inch Color Display and 15-inch Gray-scale Display. With 0, 2 or 4 MB of on-board RAM, the PowerVision's pass-thru connector lets you use existing RAM, and our installation video

makes setup a snap (professional installation also available).

The **Mirror ViewPort™** is a 15-inch monochrome display with a built-in SCSI video controller and QuickDraw acceleration for performance rivaling internal video boards. Ideal for PowerBooks, the ViewPort brings big screen power to any Mac with a SCSI port. (continued)

The NEW Mirror 14-inch
Color Display
\$399

Mirror PowerDock™
battery powered base
unit and charger.*
\$199

Mirror Pocket Hard Drives

40 MB \$399 ◀

80 MB \$599 ◀

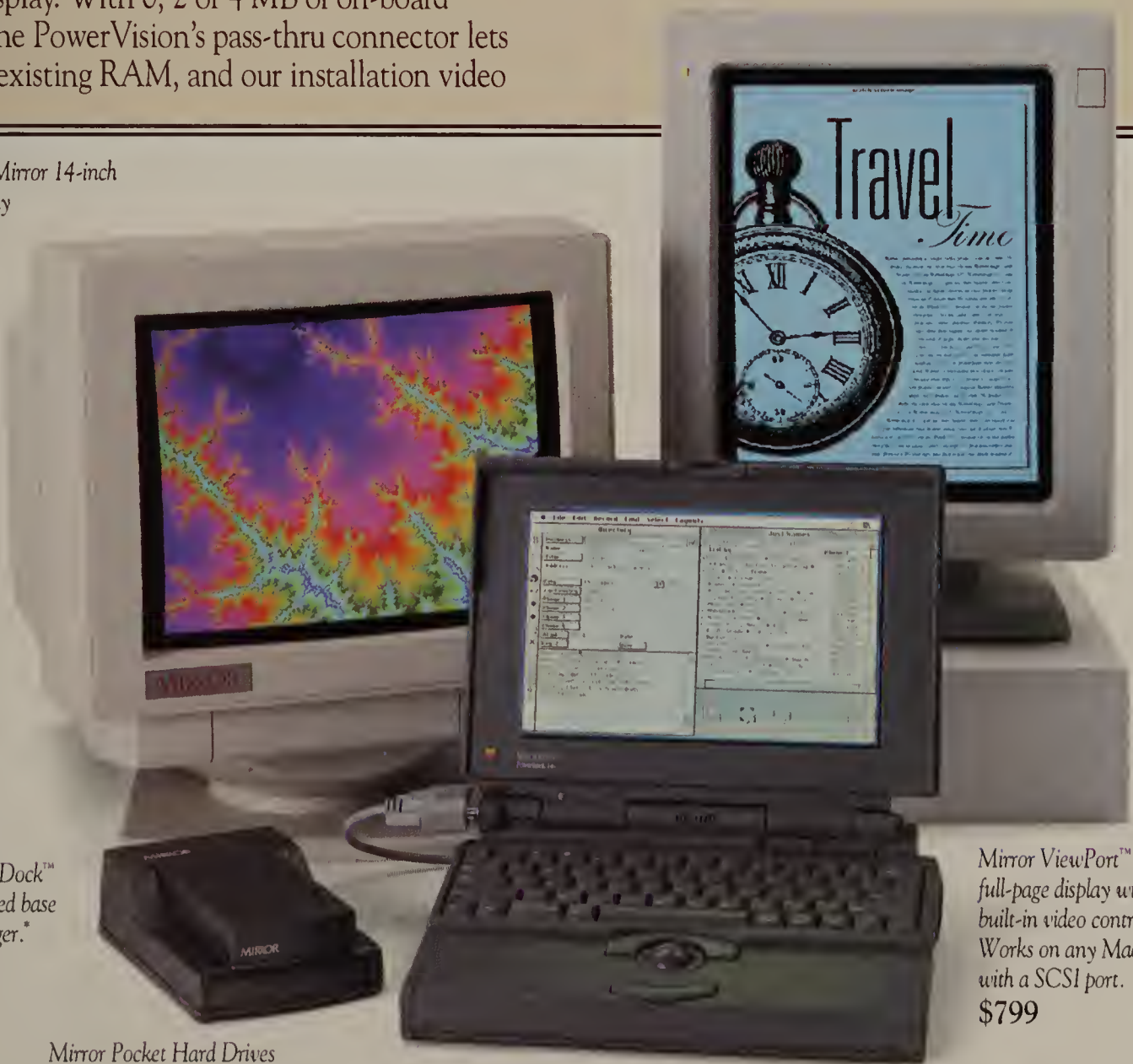
120 MB \$749

Includes SCSI cable for PowerBooks
and standard Macs--a \$100 value!

PowerVision internal video adapter board includes
tools and a comprehensive installation video. from \$549†

Systems including PowerVision board and display from \$948†

Mirror ViewPort™
full-page display with
built-in video controller.
Works on any Mac
with a SCSI port.
\$799



...And Powerhouse Peripherals

The NEW Mirror 14-inch Color Display is the latest version of our best selling color monitor. Designed to work with the built-in video of your Mac LC, IIsi, Ilci, or Quadra--or with Mirror's PowerVision video board for

PowerBooks; this display features razor-sharp focus and brilliant color and it's still only \$399!*

The **Mirror Pocket Hard Drives** and optional

Mirror PowerDock** redefine storage convenience. For moving data between machines, or to expand your PowerBook's capacity, these tiny drives fit anywhere. Slip the Pocket Drive into the PowerDock and use a standard PowerBook battery to power the drive while you travel. When you're back home, the PowerDock does double duty and charges your spare battery.

Whatever your need, whatever Macintosh model you use, Mirror has high performance peripherals to match.

Our complete line of storage systems can handle any task. From our critically acclaimed hard drives and CD-ROM, to our high performance 128 MB Optical

Drives	Int.	Ext.
45 MB	\$249	\$299
50 MB (Q)	\$279	\$339
105 MB (Q)	\$419	\$479
120 MB (Q)	\$469	\$529
210 MB (Q)	\$689	\$749
240 MB (Q)	\$739	\$799
330 MB	N/A	\$1,199
425 MB	N/A	\$1,299
425 MB (Q)	\$1,289	\$1,349
595 MB	N/A	\$1,599
1 GB	N/A	\$2,099
45 MB Portable Drive	\$269	
50 MB (Q) Portable Drive	\$299	
105 MB (Q) Portable Drive	\$449	
240 MB (Q) Portable Drive	\$769	
128 MB Optical Drive	\$1,399	
600 MB Optical Drive	\$2,299	
44 MB SyQuest Drive	\$449	◀
88 MB SyQuest Drive	\$549	◀
DAT Tape Drive	\$1,399	◀
CD-ROM Drive	\$599	

20-inch ProView Trinitron Display, 8-bit \$2,499

w/ 24-bit video card \$2,799 ◀

20-inch ProView V Color Display, 8-bit \$1,799

w/ 24-bit video card \$2,199 ◀

16-inch Trinitron Display \$1,199+

w/ 8-bit video card \$1,599

w/ 16-bit video card \$1,699

w/ 24-bit video card \$1,999

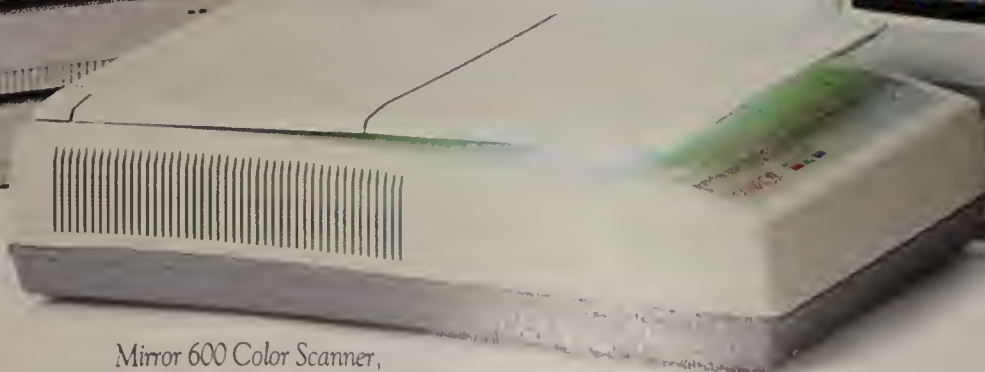
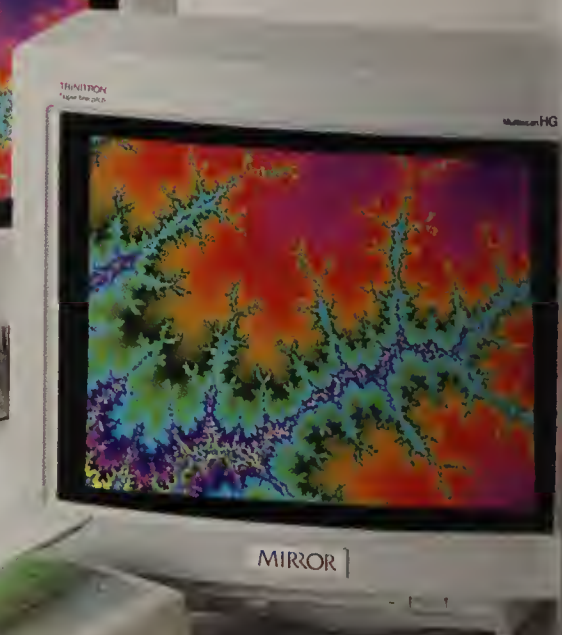
16-inch Color Display \$899+

w/ 8-bit video card \$1,299

w/ 16-bit video card \$1,399

w/ 24-bit video card \$1,699

14-inch Color Display \$399+



Mirror 600 Color Scanner,
with Adobe Photoshop \$1,199

NEW
Lower Price!

Gems For The Desktop.

Drive and DAT Tape Drives, Mirror offers the capacities, speed, features and prices you want.

Once you've used a Mirror high resolution display, you'll wonder how you ever lived without it. Our monochrome full-page and two-page displays deliver bright, sharp screen images for word processing, spreadsheets, database management and publishing.

For graphic design, illustration or pre-press, choose a Mirror color display. Available in 14-inch, 16-inch and 20-inch models, there's a Mirror color display that's right for every job.

The top-rated Mirror Color Scanner makes it easy

to add sharp, vivid color images to your work at an unbeatable Mirror price; just \$1199 including Adobe Photoshop.

If you need a printer, take a close look at the MirrorImage 309 Laser Printer and the MirrorImage 415 Tabloid Laser Printer. With Postscript Level 2, RISC processors, sophisticated paper handling and durable, high-speed printing engines, these printers work hard, so you don't have to.

All Mirror products are backed by our famous 30-day, "love it our return it" policy*, and the best customer support in the business. Call today to see for yourself.

MIRROR

1 - 8 0 0 - 6 5 4 - 5 2 9 4

ORDER DIRECT

FAX 612-633-3136

MEDIA:1021

MirrorImage 415, Tabloid Laser Printer, features dual paper trays and a 15 pages-per-minute print engine. Leases available. **\$4,499**

19-inch Two-page Display w/ monochrome video card **\$799**
21-inch Two-page Display **\$799***
w/ monochrome video card **\$999**



MirrorImage 309, Postscript 2 laser printer **\$1,699**

15-inch Grayscale Portrait Display **\$399*** ◀
w/ monochrome video card **\$549** ◀

®Trinitron is a registered trademark of Sony Corporation. Technical Support Hotline: 1-612-633-2105 Telephone: 1-612-633-4450 FAX: 1-612-633-3136 Address: 2644 Patton Road, Roseville, MN, USA 55113

Circle 125 on reader service card

File

It
won't
hop.

Edit

It won't skip.

Chooser

But wait till you
see it jump.



While the cursor may hop or skip with some trackballs, Turbo Mouse® has always been known for its ultrasmooth movement.

Now, the latest version of Turbo Mouse is known for something else—jumping. Our new Brilliant Cursor technology makes it possible.

With it, you can move the cursor instantly to predefined HotSpots on the screen, such as the File and Edit menus and the Trash icon.

First, you define your HotSpots. Then, click a button and move the ball in the direction you want to go. The cursor automatically jumps to the predefined HotSpot. You can even program in different HotSpots for different applications and for different users.

And Brilliant Cursor technology is not all that's new with Turbo Mouse 4.0. Also new is advanced acceleration with three levels of control and Enhanced Mouse Buttons that let

you execute one of seven programmable commands. For example, send a Print command with just one click using Send String. Or move the cursor with ultra precision using Slow Cursor. Even save different combinations of commands for each of your favorite programs.

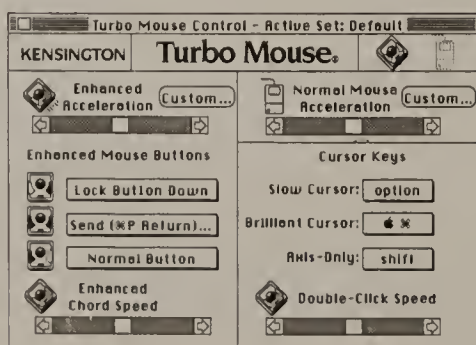
Then there's the award winning Turbo Mouse hardware. Hardware that has won more awards than any other input device. Hardware that has consistently been voted "Best Input Device" by Macintosh

users worldwide. Features include a large comfortable ball, "easy-click" buttons, long-lasting precision stainless steel bearings, and two ADB ports for chaining other devices.

Turbo Mouse 4.0 is fully System 7.0 compatible. To receive information by fax, call 800-535-4242, dial 82 and request document 320. For general information, call 800-535-4242. Outside the US, 415-572-2700.

Introducing Turbo Mouse 4.0

With the all new Brilliant Cursor™ technology,
you can actually make the cursor jump
to any spot on the screen.



KENSINGTON